

# California Bureau of Automotive Repair Smog Check Technician Licensing Examination

## CANDIDATE HANDBOOK



**For: Basic Area (Test and Repair) Technician  
Advanced Emission (Test and Repair) Technician**

**For Examinations March 1, 2001 and Later**

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## FOR MORE INFORMATION

All questions about examination administration  
should be directed to:

**Experior**  
**3110 Gold Canal Drive, Suite B**  
**Rancho Cordova, CA 95670**  
**TDD User: 800-790-3926**  
**Voice: 800-897-2241**

Questions about license applications or license issuance  
should be directed to:

**Department of Consumer Affairs**  
**Bureau of Automotive Repair**  
**Licensing Unit**  
**P.O. Box 989001**  
**West Sacramento, CA 95798-9001**  
**800-952-5210 or 916-255-3145**

## SECTION I: INTRODUCTION

### Purpose

The California Department of Consumer Affairs, Bureau of Automotive Repair (BAR) developed this handbook to help you prepare for the Smog Check Technician Licensing Examination. The purpose of the examination is to determine the basic qualifications of the applicant. We strongly recommend that you study every section carefully, well in advance of the examination date.

Licensed Smog Check Technicians may conduct both initial and after-repair certification tests on vehicles included in the Smog Check Program. They may also perform vehicle emission control system adjustments, diagnoses and repairs to failed vehicles at licensed Test and Repair stations.

**This handbook will not give you all the knowledge that you need.** It is intended to help you decide what training and/or skills you may need to pass the exam, and provide an idea of what the actual test is like.

The handbook gives recommendations for studying, information on the format of the examination, a general description of the examination and examples of the kinds of test items you will encounter.

### Expiration of License

Technicians must pass an examination every other year to remain licensed. The license expiration dates are adjusted so that the licenses expire in the month of the technician's birthday. Therefore, licenses are valid for 18 to 30 months, depending upon the technician's birth month and the month in which the technician passes the licensing examination. This process is fully explained in California Code of Regulations, Title 16, Section 3340.29 (e):

"A technician's license shall expire on the last day of the month in which the second birthday of the technician occurs after the date of issuance of the license. Initial license expiration dates are calculated from the date the department is notified that an applicant passed the licensing examination. Once a license has been issued that expires in the birth month, subsequent renewal licenses will expire on the last day of the birth month, two years later. Withholding a license for enforcement purposes, or issuance of a temporary license due to family support obligations, does not change the expiration date as calculated above."

## SECTION II: BAR SMOG CHECK TECHNICIAN COMPETENCY STATEMENT

First and foremost, a Smog Check Technician is a professional, working as a partner with government and the public in cleaning up California's air. To meet this need, a Smog Check Technician must be able to do each of the following:

1. Understand the basic functions of vehicle engines and emission controls.
2. Determine the need for inspection, type of inspection, and correct inspection procedures.
3. Identify vehicles that must be inspected by Referee stations, and give the consumer correct and adequate information about the Referee process.
4. Identify each vehicle by year, make, model, and certification status.
5. Understand and use inspection, diagnostic, and repair reference materials to determine required emission control equipment and vacuum hose routing.
6. Determine what emission control equipment is required, evaluate the actual condition of the required equipment, and correctly report the condition.
7. Operate emission test equipment and diagnostic equipment.
8. Perform complete and accurate functional and emission tests on the wide variety of vehicles in the Smog Check Program.
9. Review and interpret emission test results and explain them to consumers.
10. Evaluate emission test results and diagnostic information to determine most likely cause(s) of failure.
11. Diagnose and correct emission problems effectively, within applicable cost limits.
12. Conduct after-repair tests properly.
13. Know and follow the requirements for written estimates, customer authorization, and record keeping.
14. Explain to a motorist why inspections and repairs are necessary, as well as why vehicles are equipped with emission controls.

## SECTION III: PREPARING FOR THE EXAMINATION

### Where to Begin

The BAR Smog Check Technician Licensing Examination evaluates a candidate's knowledge of Smog Check Program inspection requirements, as well as diagnosis, repair and retest of failed vehicles. Examination questions are based on the Examination Plans in Section V. Review this outline carefully and plan an appropriate schedule of study or review.

### How the Examinations are Developed

The examinations are developed by licensed Smog Check Technicians who work within guidelines established by DCA/BAR for the licensing of many regulated trades and professions. Every attempt is made to assure that the questions fairly and reasonably measure the competencies listed in the Examination Plans in Section V.

First, the questions are written in a structured setting by technicians, and are edited and reviewed by another group of technicians. This assures that the questions are job-related and written in terms used by practicing technicians. This process provides for an impartial review of the questions to verify their accuracy and technical quality.

Before being used in a licensing exam, the questions are field-tested, an analysis is performed, and a series of computer-generated statistics is compiled on each question. These statistics assist BAR in determining if a question is a fair measure of knowledge.

Then, the passing score is determined by another group of licensed technicians, who evaluate the difficulty of each question, as it relates to entry-level practice. These evaluations are analyzed, and the passing score is determined, with an acceptable level of confidence that the examination separates the qualified candidates from the non-qualified candidates. Different forms of the examination may have different passing scores.

### License Classes

All applicants for a Smog Check Technician license must use the most current application form (Form #T-6, REV. 10/99).

Regulations establish three classes of licenses: Intern, Basic, and Advanced. Detailed descriptions and requirements are contained in the charts on Pages 4 to 6 of this handbook.

Technicians employed to perform inspections, repairs and certifications at stations in the Enhanced Program areas must obtain an Advanced Emission Technician License. Technicians may consult BAR's ZIP code list to determine if they are in a Basic or Enhanced area. A ZIP code list is available from BAR by calling 800-952-5210, or it may be viewed on BAR's Web site at [www.smogcheck.ca.gov](http://www.smogcheck.ca.gov).

Technicians employed in a Basic area may opt for the Basic Area Technician or Advanced Emission Technician license at the time of initial application. Advanced licensees may perform

inspections and repairs (depending on station type) to failed vehicles at all licensed stations in California.

### Trade Experience

Significant portions of the examinations relate directly to actual situations. Therefore, experience you acquire performing tune-up, emission control, and related diagnostic and repair work increases the likelihood that you will answer these questions correctly.

### Training

Smog Check Technicians shall have the option to do hands-on work in lieu of written work in order to successfully complete the department certified training and retraining courses or may complete comparable military training as documented by submission of Verification of Military Experience and Training (V-MET) records in lieu of meeting any other training-related requirements.

### Review Courses and Publications

Some persons may offer review or preparation courses or publications. We have no information to indicate that applicants who use these sources have a higher pass rate than those who do not. Courses other than BAR-certified Clean Air Car (or citation) courses are **not** associated with BAR. No publishers or course sponsors have legal access to BAR's examination materials. We make every effort to ensure that the contents of our examinations remain confidential and that the questions are changed frequently.

### Resources

#### A. INFORMATION ON PERFORMING INSPECTIONS

Review of BAR training materials is helpful. They include the Student Materials Packet for the BAR-certified Clean Air Car Course, the current edition of the Smog Check Inspection Manual, the BAR "Write It Right" booklet and videos, as well as current Laws and Regulations Relating to Licensed Smog Check Stations.

**Some of these materials may be purchased from BAR field offices, or by mail from BAR.** The Student Materials Packet is available only by mail. See the Reference List on the following page.

#### B. INFORMATION ON DIAGNOSIS AND REPAIR

A number of commercial publications (as well as training classes) offer detailed diagnostic and repair information. They may be obtained from public and college libraries, bookstores, test equipment manufacturers' courses (including diagrams and illustrations), parts manufacturers' courses, independent schools, and vehicle manufacturers' schools.

## REFERENCE MATERIALS

Below is a list of the reference materials that were used when the subject matter experts wrote examination questions. These references may be of use to you when preparing to take the examination. BAR does not endorse these publications other than to disclose that they were used in the examination development process.

### *(Available at libraries or from publishers)*

Listed below are reference materials used by licensed Smog Check Technicians when writing questions for the Basic Area Technician and Advanced Emission Technician licensing examinations. These books are available at some public libraries, some community college libraries and bookstores, or can be ordered by any bookstore. When available, a telephone number for the publisher is included.

Also used as references when developing the examination are standard emission control diagnostic and repair manuals, as each licensed Smog Check Test and Repair Station is required to maintain.

Chek-Chart Scan Tool and Lab Scope Guide

Chek-Chart Publications, www.chekchart.com, 800-662-6277

Duffy, James E. Auto Electricity, Electronics, Computers. South Holland, Illinois; Goodheart-Willcox Co., Inc. 1989; 708-333-7200

ISBN# 0-87006-694-3

Duffy, James E., and Smith, Howard Bud Auto Fuel and Emission Control Systems. South Holland, Illinois; Goodheart-Willcox Co., Inc. 1992; 708-333-7200

ISBN# 0-87006-932-2

Escalambre, Rick Advanced Automotive Emissions Systems. Delmar Publishers, 3 Columbia Circle, Box 15015 Albany, New York 12212-5015; 800-347-7707

ISBN# 0-8273-7154-3

Halderman, James Advanced Engine Performance Diagnosis. Prentice-Hall, Inc., Upper Saddle River, New Jersey 07458 800-223-1360

ISBN# 0-13-576570-6

Layne, Ken Automobile Electronics and Basic Electrical Systems, Volume 1: Text. New York; John Wiley & Sons. 1990 800-223-1360

ISBN# 0-471-61763-6

Layne, Ken Automobile Electronics and Basic Electrical Systems, Volume 2: Practice Manual. New York; John Wiley & Sons. 1990; 800-223-1360

ISBN# 0-471-61762-8

Layne, Ken Automotive Engine Performance, Second Edition. Tuneup, Testing, and Service. Volume 1: Text. Englewood Cliffs, New Jersey; Regents/Prentice Hall; 800-223-1360

ISBN# 0-413-059775-9

Layne, Ken Automotive Engine Performance, Second Edition. Tuneup, Testing, and Service. Volume 2: Practice Manual. Englewood Cliffs, New Jersey; Regents/Prentice Hall 800-223-1360

ISBN# 0-413-059775-9

Probst, Charles O. Bosch Fuel Injection & Engine Management. Cambridge, Massachusetts; Robert Bentley, Inc. 1989 800-423-4595

ISBN# 0-8736-0300-5

### *(Available for purchase from BAR)*

The following BAR publications have been used as references when writing questions for the Basic Area Technician and Advanced Emission Technician licensing examinations. They are available from the Bureau of Automotive Repair as a student set, known as the Clean Air Car Course Student Materials Set, for \$23. The individual prices are listed with each item.

Clean Air Car Course Student Workbook. Bureau of Automotive Repair, 1993. \$10.

Clean Air Car Course Training Manual. Bureau of Automotive Repair, 1992, FREE.

Smog Check Inspection Manual. Bureau of Automotive Repair, \$12.

Write It Right Booklet. Bureau of Automotive Repair, 1<sup>st</sup> copy free.

Laws and Regulations Relating to Automotive Repair Dealers and Smog Check Stations. Bureau of Automotive Repair, 1<sup>st</sup> copy free.

Car Care for Healthy Air video. Bureau of Automotive Repair, \$6.

To purchase the *Clean Air Car Course Student Materials Set*, **send a check or money order for \$23** (includes tax and shipping charges) to:

BAR Mail Room  
10240 Systems Parkway  
Sacramento, CA 95827-3006

An order blank is available from the Smog Check Web site.

## DESCRIPTION OF CLEAN AIR CAR COURSES

The **Basic** course is a minimum of 48 hours in length and covers:

- Operation of BAR90 ET emission analyzer system
- BAR rules & regulations
- Vehicle emission testing procedures for the Basic Smog Check Program

Students entering the course must have one year experience/education in the automotive engine performance area. The instructor will determine if the student has the required automotive knowledge to enter the course.

The **Advanced** course is a minimum of 28 hours in length and covers:

- NOx emissions diagnostic and repair procedures
- Setup and operation of a Digital Storage Oscilloscope (DSO), and oxygen sensor waveform analysis
- Loaded mode emissions baselining techniques, and application of BAR's diagnostic flowchart
- Catalytic converter theory, operation and efficiency testing procedures
- Vehicle emissions testing procedures using the BAR97 EIS for the Enhanced Smog Check Program

## INTERN TECHNICIAN LICENSE REQUIREMENTS

**\*\*THIS LICENSE DOES NOT REQUIRE AN EXAMINATION\*\***

Use/Expiration	Duties
The license is valid for <b>all</b> areas of the state.  The license expires in <b>two</b> years, can only be issued once and is nonrenewable.	The license allows an individual, <b>under the direction of a licensed supervising technician</b> , to perform repairs, or adjustments to the emission control systems on vehicles subject to the Smog Check Program.
Education/Experience	
To qualify for the Intern Technician license, the applicant must have one year experience and/or education in the engine performance area, and have completed the Bureau of Automotive Repair's Basic Clean Air Car Course within the last 12 months.	

## BASIC AREA TECHNICIAN LICENSE REQUIREMENTS

### THIS LICENSE REQUIRES AN EXAMINATION

Use	Duties	Required Certifications
The license is valid in the Basic or Change of Ownership Program areas of the state.	Depending on station type, the license allows an individual to inspect, diagnose, adjust, repair and certify the emissions control systems on vehicles subject to the Smog Check Program at Smog Check stations in areas of the state designated as Basic Smog Check Program areas.	<p>The following BAR-certified courses satisfy the certification requirements for licensure. The course completion is valid for five years.</p> <ul style="list-style-type: none"> <li>• Electrical/Electronic Systems (20-hour minimum)</li> <li>• Engine Performance (24-hour minimum)</li> <li>• Advanced Engine Performance/Emission Systems (28-hour minimum) <b>Required Jan. 1, 2002.</b></li> </ul> <p><b>Note:</b> Unexpired ASE certifications in the areas of A6 &amp; A8 (and L1), respectively, are acceptable in place of the above courses.</p>
<b>Education/Experience</b>		
<p>To qualify to take the examination, the applicant must meet <b>one</b> of the following requirements:</p> <ol style="list-style-type: none"> <li>1. Possess a valid unexpired Basic Area, or Advanced Emission Specialist Smog Check Technician License.; OR</li> <li>2. Possess a valid unexpired Intern Technician license and have one year experience as an Intern Technician; OR</li> <li>3. Have one year of automotive experience and/or education in the engine performance area, and have completed the Bureau's Basic Clean Air Car Course within the last 12 months.; OR</li> <li>4. Possess an Associate of Arts, Associate of Science, or higher degree in Automotive Technology from a state-accredited or recognized college, public school, or trade school AND have successfully completed the Bureau of Automotive Repair's Basic Clean Air Car Course within the last 12 months; OR</li> <li>5. Possess a certificate in Automotive Technology from a state-accredited or recognized college, public school, or trade school with a minimum of 360 hours of coursework in the engine performance area, AND have successfully completed the Bureau of Automotive Repair's Basic Clean Air Car Course within the last 12 months.</li> </ol>		
<b>Update Training</b>		
Beginning February 1, 2001, an applicant for an initial or renewal Basic license must provide proof of successful completion of the BAR-certified update training course regarding On-Board Diagnostics II (OBD II). Update training courses may be up to 20 hours in length.		
<b>Locating Providers of Alternative &amp; Update Training</b>		
Information regarding alternative courses and update training courses is available through BAR's toll-free number, 800-952-5210, or BAR's Internet site at <a href="http://www.smogcheck.ca.gov">www.smogcheck.ca.gov</a> .		

## ADVANCED EMISSION TECHNICIAN LICENSE REQUIREMENTS

### THIS LICENSE REQUIRES AN EXAMINATION

Use	Duties	Required Certification
The license is valid for all areas within the state.	Depending on station type, the license allows an individual to inspect, diagnose, adjust, repair and certify the emission control systems on vehicles subject to the Smog Check Program in all parts of California.	<p>The following BAR-certified courses satisfy the certification requirements for licensure. The course completion is valid for five years.</p> <ul style="list-style-type: none"> <li>• Electrical/Electronic Systems (20-hour minimum)</li> <li>• Engine Performance (24-hour minimum)</li> <li>• Advanced Engine Performance/Emission Systems (28-hour minimum).</li> </ul> <p><b>Note:</b> Unexpired ASE certifications in the areas of A6, A8, &amp; L1, respectively, are acceptable in place of the above courses.</p>
<b>Education/Experience</b>		
<p>To qualify to take the examination, the applicant must meet <b>one</b> of the following requirements:</p> <ol style="list-style-type: none"> <li>1. Possess a valid unexpired Advanced Emission Specialist Smog Check Technician License.; OR</li> <li>2. Possess a valid unexpired Basic Area Smog Check Technician license, AND have completed the Bureau of Automotive Repair's Advanced Clean Air Car Course within the last 12 months; OR</li> <li>3. Possess a valid unexpired Intern Technician license, have one year experience as an Intern Technician, AND have completed the Bureau of Automotive Repair's Advanced Clean Air Car Course within the last 12 months; OR</li> <li>4. Have one year of automotive experience and/or education in the engine performance area, and have completed the Bureau of Automotive Repair's Basic <b>and</b> Advanced Clean Air Car Courses within the last 12 months.; OR</li> <li>5. Possess an Associate of Arts, Associate of Science, or higher degree in Automotive Technology from a state-accredited or recognized college, public school, or trade school AND have successfully completed the Bureau of Automotive Repair's Basic <b>and</b> Advanced Clean Air Car Courses within the last 12 months; OR</li> <li>6. Possess a certificate in Automotive Technology from a state-accredited or recognized college, public school or trade school with a minimum of 360 hours of coursework in the engine performance area, AND have successfully completed the Bureau of Automotive Repair's Basic <b>and</b> Advanced Clean Air Car Courses within the last 12 months.</li> </ol>		
<b>Update Training</b>		
Beginning February 1, 2001, an applicant for an initial or renewal Advanced license must provide proof of successful completion of the BAR-certified update training course regarding On-Board Diagnostics II (OBD II). Update training courses may be up to 20 hours in length.		
<b>8-Hour BAR-97 Transition Class</b>		
This class is <b>not</b> required as a prerequisite to take the licensing examination. However, technicians must pass the 8-hour BAR-97 Transition Class before they are granted access to the BAR-97 Emissions Inspection System. These classes are provided by various community colleges, adult educational programs, and private vendors such as equipment manufacturers.		
<b>Locating Providers of Alternative, Update and Transition Training Classes</b>		
Information regarding alternative, update and transition training courses is available through BAR's toll-free number, 800-952-5210, or BAR's Internet site at <a href="http://www.smogcheck.ca.gov">www.smogcheck.ca.gov</a> .		

## SECTION IV: APPLICATION PROCEDURES

### How To Apply

The license application is a separate form included in this packet. Applications must be complete and accurate, submitted with a \$20 application fee to BAR's Licensing Unit. Incomplete applications will be rejected, delaying the review process.

**Renewal applications will be accepted by BAR up to six months before the expiration date of the license.**

**Current policy allows two test attempts before applicants are required to submit another application.**

Applicants who falsify applications or supporting documents may have their licenses denied, revoked or suspended.

The examination fee will be collected separately by the examination administration contractor, Experior Assessments™, LLC (Experior).

### Special Accommodations Available

If you need special accommodations to take the exam, mark the box on the application indicating that you may need assistance during the written examination. BAR will mail you a Request for Special Accommodations form, which must be completed and returned. You will be required to explain the disability and what special accommodation is needed. A letter from your health-care provider must be included, confirming the disability and justifying the need for special accommodations using the criteria in the request form.

**NOTE:** English as a second language is NOT a disability, and special accommodations are not granted.

### Candidate Eligibility

Once a candidate is determined to be eligible, BAR will notify Experior. Experior will mail an eligibility notice indicating how the candidate may register for and schedule an exam. An examination appointment date is usually available to each candidate within two weeks.

To be eligible to take the examination, the applicant must not have any unpaid citations. Pending enforcement actions will not prohibit you from taking the examination, but may prevent issuance of a license.

In addition, the law requires the Department to check a list of individuals who have not paid their family support obligations. A professional license cannot be issued or renewed for an individual who has been identified by a California District Attorney as not meeting their family support obligations. However, a temporary license (valid for 150 days) may be issued to permit resolution of the family support hold. An existing license can be suspended after notice is given to the licensee.

### Application And Examination Fees

A \$20 application fee must accompany your initial or renewal licensing application. Your approved application allows you to take the examination a second time if you fail the first attempt. However, there must be at least 14 days between test attempts. If you fail the second attempt, you must submit another application, and \$20 application fee, to the BAR Licensing Unit. See the flowchart on Page 35 for details.

A separate \$65 examination fee must be paid to Experior for **each** examination attempt. If you cancel or don't show up without following Experior's guidelines, the examination fee is forfeited. See "Rescheduling" on Page 30 for further details.

## SECTION V: DESCRIPTION OF THE EXAMINATIONS

Listed below are the nine major sections of both the Basic Area Technician and the Advanced Emission Technician examinations, as well as the number of examination questions devoted to that section in each examination.

<b>Examination Sections</b>	<b>Number of Questions</b>	
	<b>Basic Area Technician</b>	<b>Advanced Emission Technician</b>
Discharging Obligations to Consumers	20	19
Identifying the Vehicle to be Tested	14	13
Inspecting the Vehicle to be Tested for Safety	3	4
Calibrating, Maintaining and Servicing the Analyzer	7	8
Preparing for and Safely Conducting Emissions Tests	16	20
Performing Visual Inspections as Prompted by Analyzer	19	17
Performing Functional Tests	10	9
Diagnosing Test Failures	18	17
Performing and Verifying Repairs	18	18

**Total: 125 Questions**

## BASIC AREA TECHNICIAN EXAMINATION PLAN

The following is the examination plan for the **Basic Area Technician** examination, which is the detailed information used by Subject Matter Experts to write examination questions.

### **I. DISCHARGING OBLIGATIONS TO CONSUMERS (15.8%)**

This area assesses the candidate's ability to communicate current laws and regulations regarding emissions tests to consumers, such that consumers will understand what is required, why it is required, and what their options are.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Determine what type of smog check a consumer needs, e.g., biennial, change of ownership, after-repair, initial registration, out-of-state vehicle.</li> <li>✓ Educate a customer regarding the need or lack of need to test a vehicle, e.g., point out that it must be tested before it can be sold, that it is too old or too new to require testing.</li> <li>✓ Determine whether a customer's vehicle must be tested at a test-only station, explain the need if necessary, and provide the BAR 800 number or a list of stations near by.</li> <li>✓ Explain "gross polluter" to a customer.</li> <li>✓ Explain to a customer why a vehicle must be tested at a station authorized to certify gross-polluter vehicles.</li> <li>✓ Explain smog check failures due to tampering and tampering's possible effects on emissions and driveability.</li> <li>✓ Obtain a customer's authorization to perform a smog check.</li> <li>✓ Inform a customer of incidental findings concerning a vehicle's need for repair, e.g., report problems that affect safety.</li> <li>✓ Explain the value of a pretest when a pretest is appropriate.</li> <li>✓ Inform a customer of a repair needed to make the vehicle safe to test and, if appropriate, provide a cost estimate.</li> <li>✓ After emissions testing print out two copies of the VIR, sign and date them, file one, and give one to the customer.</li> <li>✓ Obtain authorization for diagnostic testing and provide the customer with a cost estimate.</li> <li>✓ Determine what repairs within the cost minimum will bring about the greatest reduction in emissions.</li> <li>✓ Obtain authorization for repairs needed to bring a failed vehicle into compliance and provide the customer with a cost estimate.</li> <li>✓ Obtain customer authorization when a repair changes and the original estimate requires revision.</li> <li>✓ Obtain customer authorization to replace components near the end of their useful life when significant other repairs are being made.</li> <li>✓ Inform a customer of possible warranty coverage for repairs.</li> <li>✓ Explain to the customer the importance of after-repairs testing.</li> <li>✓ Fully disclose to the customer the costs of all recommended procedures, e.g., test, repair, retest.</li> <li>✓ Provide the customer with a detailed invoice concerning diagnoses and repairs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of the laws and regulations requiring vehicles to undergo emissions tests, e.g., Knowledge that some vehicles require no testing, that a change of ownership requires certification for which the seller is responsible.</li> <li>✓ Knowledge of the test-only program, of how vehicles are chosen to participate, and of why particular vehicles are chosen.</li> <li>✓ Knowledge that a technician may provide a list of near-by stations of the type that a customer needs to visit but may not recommend one.</li> <li>✓ Knowledge of why a test-only station does not perform repairs.</li> <li>✓ Knowledge of the conditions that require or allow a vehicle to be sent to a referee station and, especially, when not to send a vehicle to a referee station.</li> <li>✓ Ability to judge whether an emissions pretest is advisable and to explain its advisability to the customer.</li> <li>✓ Ability to determine from a pretest whether a particular vehicle would fail its emissions test as a gross polluter.</li> <li>✓ Knowledge that a gross polluter must be tested at a station authorized to certify it.</li> <li>✓ Knowledge of the circumstances in which no cost minimum applies to repairs needed to make a failed vehicle legally usable.</li> <li>✓ Knowledge of myths about emissions control equipment that prevail among consumers and of why they are myths.</li> <li>✓ Knowledge of tampering, of its effects on emissions, and of the laws, regulations, and BAR policies concerning it.</li> <li>✓ Knowledge that warning a customer about potential vehicle systems failures is both professional behavior and good business.</li> <li>✓ Ability to determine whether a repair is needed before emissions testing.</li> <li>✓ Ability to prepare lawful estimates for the costs of diagnoses and repairs or to provide information for such estimates to service writers.</li> <li>✓ Ability to explain to a customer why diagnostic tests are needed.</li> <li>✓ Knowledge of the legal \$450 repair cost minimum and of how it applies to correcting vehicle failures.</li> <li>✓ Knowledge of diagnoses and repairs that optimize value to customers, e.g., That bring about the best reductions in emissions possible within the \$450 repair cost minimum.</li> </ul>

## I. DISCHARGING OBLIGATIONS TO CONSUMERS (15.8%)

*continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ As needed, explain the differences between smog checks in basic and enhanced areas.</li> <li>✓ Create repair records when appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of alternate routes to qualifying vehicles for use, e.g., knowledge of the circumstances in which a customer and vehicle qualify for a waiver or help from the state with repair costs.</li> <li>✓ Knowledge of vehicle warranties required by State and Federal law and of how to find warranties for particular vehicles.</li> <li>✓ Knowledge of the relationships between controlling CO or HC emissions and making NOx emissions worse.</li> <li>✓ Ability to explain to a customer why verifying the effectiveness of repairs is necessary.</li> <li>✓ Ability to provide a customer with lawful, detailed invoices concerning diagnoses and repairs or to furnish the necessary information for such invoices to service writers.</li> <li>✓ Knowledge of how to locate hard-to-find repair parts and how to guide a customer through a proper sequence—local stores, manufacturers, wrecking yards, parts locators—for finding them.</li> </ul>

## II. IDENTIFYING THE VEHICLE TO BE TESTED (11.4%)

This area assesses the candidate's ability to verify that the vehicle presented for testing is the vehicle identified in the owner, vehicle and registration information, as well as to identify and verify that the vehicle is equipped with all required and/or authorized emissions, engine, power train, etc. equipment.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Verify the presence or absence of a VIN label and its accuracy, if present.</li> <li>✓ Determine whether a DMV notice correctly identifies the vehicle; e.g., determine that DMV made no errors in its ID number or license number.</li> <li>✓ Verify that the vehicle's VIN and odometer mileage match their counter-parts in the DMV renewal notice, service writer's work order, or other documentation concerning the prospective test.</li> <li>✓ Check the owner's zip code to verify that the vehicle has been presented for testing in an appropriate testing area.</li> <li>✓ Check that the year, make, and model of the vehicle to be tested match its description in the documents concerning it.</li> <li>✓ Check the engine, power train, and other equipment of the vehicle to determine its identity and check that these components are original equipment or permitted substitutes.</li> <li>✓ Determine the presence or absence of vehicle emission labels and their accuracy.</li> <li>✓ Verify that the under-hood emissions label and any BAR label (a) belong on the vehicle to be tested and (b) help confirm its identity.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to determine from the owner's zip code whether a vehicle is being presented for testing in an appropriate testing area.</li> <li>✓ Knowledge of the information about a vehicle that its VIN contains.</li> <li>✓ Knowledge that DMV renewal notices, repair orders, or other documentation may contain errors in VINs or license plate numbers; i.e., that the vehicle itself is the first source for identification.</li> <li>✓ Knowledge, for both common and specialized vehicles, of where to find standard labels related to smog checks, of how to access and interpret the information they contain, and of how to use them, if necessary, to confirm the vehicle's identity.</li> <li>✓ Knowledge that a vehicle may have a replacement hood or radiator support bearing a label issued to a different vehicle.</li> <li>✓ Ability to use a manufacturer's manual or ECS applications guide to identify required emissions control equipment in the absence of a correct, legible label, or to determine that a vehicle was not built to meet California emissions control requirements.</li> <li>✓ Knowledge that vehicles not equipped to meet California or federal emissions standards must be sent to a referee station for testing.</li> <li>✓ Knowledge of the information to use—e.g., year, make, model, state or province of licensure, odometer mileage, engine configuration, type of drive train, type of computer, emissions control equipment—in confirming the identity given by VIN, license plate, labels, and documents concerning the vehicle.</li> </ul>

## II. IDENTIFYING THE VEHICLE TO BE TESTED (11.4%)

*Continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Determine from the under-hood label whether a vehicle was built for use in California, the other 49 states, Canada, or elsewhere outside the United States; i.e., whether it was intended to meet California emissions specifications.</li> <li>✓ Use the under-hood emissions label, a manufacturer's manual, or an applications manual to determine a vehicle's required emission control components.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to use references that supply information about how particular vehicles are configured and equipped, e.g., to use an electronic reference to obtain a printout concerning a vehicle's required emission control equipment.</li> <li>✓ Knowledge of gray-market vehicles, of how to identify them from their VINs and emissions control equipment, and of how to respond when they are presented for testing.</li> </ul>

## III. INSPECTING THE VEHICLE TO BE TESTED FOR SAFETY (2.1%)

This area assesses the candidate's ability to identify and determine whether the vehicle presented for testing has any conditions that would render any emissions testing problematic and/or unsafe.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Visually check a vehicle presented for testing, looking for fluid leaks, excessive tire wear, frayed fan belts, weakened radiator hoses, or other conditions that may render it unsafe to test.</li> <li>✓ Safety-check a vehicle presented for testing, checking for indicator lights, exhaust smoke or vapor, and sounds, odors, vibrations, or other conditions, such as a slipping clutch or faulty brakes, that indicate need for repairs before testing.</li> <li>✓ With customer authorization, correct quickly correctable conditions—e.g., underinflated tires; insufficient oil, coolant, transmission fluid, or brake fluid—that should be corrected before testing.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to determine whether a vehicle's fluid levels will permit safe testing and to correct them if correcting them is feasible.</li> <li>✓ Knowledge of vehicle conditions that would render any emissions testing problematic or unsafe.</li> <li>✓ Ability to determine from inspection or a test drive whether a vehicle can be tested safely.</li> </ul>

## IV. CALIBRATING, MAINTAINING AND SERVICING THE ANALYZER (5.9%)

This area assesses the candidate's ability to interpret and respond to analyzer prompts, to identify and troubleshoot routine system malfunctions and to perform required analyzer service procedures.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Respond to analyzer maintenance prompts, e.g., a prompt for calibration.</li> <li>✓ Perform a 3-day gas calibration on a BAR 90 analyzer.</li> <li>✓ Visually inspect analyzer devices, e.g., check for broken flex probe, kinked or deteriorated sample hose, dirty filters, plugged water trap drain.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to interpret and respond to analyzer maintenance prompts.</li> <li>✓ Knowledge of how to perform a gas calibration on a BAR 90 analyzer.</li> <li>✓ Knowledge of how to perform a gas calibration on a BAR 97 analyzer and of how to calibrate the dynamometer.</li> <li>✓ Ability to determine whether analyzer devices—e.g., probe tips, sample hose, filters, water trap drain—are functioning correctly.</li> <li>✓ Knowledge of how to check the operation of the fuel cap tester.</li> </ul>

#### IV. CALIBRATING, MAINTAINING AND SERVICING THE ANALYZER (5.9%)

*Continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Repair or replace defective components, e.g., hoses, flex probe, tach leads, filters, as needed.</li> <li>✓ Respond to failure prompts, e.g., purge HC hang-ups, correct analyzer lock-ups.</li> <li>✓ Troubleshoot a printer failure that occurs without failure prompt; i.e., check and correct paper jams.</li> <li>✓ Identify and troubleshoot system malfunctions, e.g., low flow through the sample hose, sample dilution, failure of a dynamometer or fuel cap tester to communicate with the analyzer.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to repair or replace defective external components of an analyzer.</li> <li>✓ Ability to respond effectively to an analyzer's failure prompts, e.g., HC hang-ups, low flow, analyzer lock-ups.</li> <li>✓ Ability to troubleshoot an analyzer's printer problems, e.g., paper jams, exhausted ink cartridges.</li> <li>✓ Ability to troubleshoot minor analyzer system malfunctions, e.g., low flow, sample dilution, failure of the fuel cap tester or dynamometer to communicate with the analyzer.</li> <li>✓ Knowledge of the causes of analyzer lock-outs and how to restore normal operation.</li> <li>✓ Knowledge of how and when to reset and refresh an analyzer.</li> <li>✓ Knowledge of how and when to obtain parts and supplies to maintain an analyzer.</li> <li>✓ Knowledge of when and how to add or delete a technician access code through BAR.</li> </ul>

#### V. PREPARING FOR AND SAFELY CONDUCTING EMISSIONS TESTS (12.5%)

This area assesses the candidate's ability to inspect the vehicle to be tested, the testing area and the testing equipment in order to ensure and maintain a safe working environment.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Ensure the testing area is safe, e.g., clear the area of loose tools, wipe up spills, exclude nonessential staff and customers.</li> <li>✓ Take precautions for personal and staff safety during the tests, e.g., run them from inside the vehicle, allow no one to work on the vehicle, avoid releasing pressurized fluids.</li> <li>✓ Follow the safety procedures recommended by vehicle and equipment manufacturers.</li> <li>✓ Start the vehicle and bring its engine to operating temperature.</li> <li>✓ As needed, pretest the vehicle, checking the fuel cap, timing, and EGR valve as well as the emissions.</li> <li>✓ Enter vehicle information and inspection results as required by the BAR 90 or BAR 97 analyzer, i.e., identify yourself by license number and access code; scan the BAR code on the renewal form or identify the vehicle as prompted; enter the gross vehicle weight rating as prompted; and respond to prompts regarding engine and emission controls.</li> <li>✓ As prompted, insert the tailpipe probe into the vehicle's exhaust system and attach the tachometer leads.</li> <li>✓ Following the prompts of the BAR 90 analyzer, run the high-rpm test.</li> <li>✓ Following the prompts of the BAR 90 analyzer, run the idle rpm test.</li> <li>✓ If sample dilution occurs, locate and correct the cause, if possible, e.g., move the probe.</li> <li>✓ Abort a smog check when necessary.</li> <li>✓ Detach the tachometer leads and remove the tailpipe probe from the exhaust system before moving the vehicle out of the testing area.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of BAR 90 testing, i.e., of the information the analyzer requires and of how to supply it and respond to the analyzer's prompts.</li> <li>✓ Knowledge of personal-safety precautions during emissions testing.</li> <li>✓ Knowledge of precautions that prevent damage to costly equipment, e.g., keeping vehicle fluids out of a dynamometer, removing the tailpipe probe and tachometer lead before moving a vehicle after testing.</li> <li>✓ Knowledge that chocking is appropriate even for BAR 90 testing because an old vehicle may slip into gear.</li> <li>✓ Knowledge of appropriate operating temperatures for a vehicle and its emission control components.</li> <li>✓ Knowledge of pretesting a vehicle so as to determine any need for repairs.</li> <li>✓ Ability to judge whether required maintenance, if indicated, will affect the vehicle's emissions.</li> <li>✓ Knowledge of when to abort problematic tests, e.g., when warning lights come on, when a substantial fluid leak occurs, when the engine pings or knocks, when the vehicle overheats or smokes.</li> <li>✓ Knowledge of where to insert the probe if sample dilution occurs.</li> </ul>

## VI. PERFORMING VISUAL INSPECTIONS AS PROMPTED BY ANALYZER (15.4%)

This area assesses the candidate's ability to locate, identify and check emissions components for proper condition and operation.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Visually inspect the PCV system, checking valve, vacuum hose, and clean-air hose to the air cleaner.</li> <li>✓ Visually inspect the TAC system for vacuum line connection and installation of the pre-heat hose and heat stove.</li> <li>✓ Visually inspect the AIS, i.e., on a pulse air system, check the control valve, hoses, and plumbing; on a pump system, check the belt, pump, check valves, and controls.</li> <li>✓ Visually inspect the EVAP system, checking vapor canister, purge solenoids, vacuum hoses, and fuel lines.</li> <li>✓ Visually inspect the EGR system, checking valve, controls, and vacuum hoses(if used in the system).</li> <li>✓ Visually inspect the catalytic converter(s), i.e., check that any required converter is present and check it for damage.</li> <li>✓ Visually inspect input sensors, i.e., check that each sensor is present and that its connecting wires are intact.</li> <li>✓ Visually inspect other computer components, checking actuator, spark controls, and output wiring.</li> <li>✓ Visually inspect vacuum hoses, i.e., check their condition, routing, and connections.</li> <li>✓ Visually inspect the fuel injection system, checking pressure regulator, injectors, wiring, and leaks</li> <li>✓ Visually inspect other emissions-related equipment, e.g., EFE, heat risers, anti-dieseling solenoids, choke controls, deceleration controls.</li> <li>✓ Verify whether a vehicle's required emission control components are present, unmodified, free of tampering, and properly connected.</li> <li>✓ Verify that a vehicle's emission control components are appropriate to its year, make, and model or are permitted substitutes for original equipment.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to check the PCV system, system operation, and related components and recognize component failures.</li> <li>✓ Ability to check air cleaner installation, condition, and operation and recognize component failures.</li> <li>✓ Knowledge of TAC function and correct TAC operation.</li> <li>✓ Ability to check the vacuum controls of a TAC.</li> <li>✓ Knowledge of how an AIS operates, where and when air injection occurs, and how to recognize system failures.</li> <li>✓ Knowledge of how to locate EVAP components and how to recognize component failures.</li> <li>✓ Ability to locate and identify a vehicle's EGR valve.</li> <li>✓ Knowledge of EGR system components and of how to recognize component failures.</li> <li>✓ Ability to locate a vehicle's catalytic converter(s), identify different types of converter, and recognize damage.</li> <li>✓ Ability to locate, identify, and evaluate the condition of computer input sensors, connectors, and wiring, using references as needed.</li> <li>✓ Ability to locate and evaluate computer output devices, connectors, and wiring.</li> <li>✓ Ability to locate and use vacuum hose routing diagrams to check hose routing and installation as well as to check hose condition.</li> <li>✓ Ability to identify approved, emissions-related changes and replacements, e.g., intake and exhaust manifolds, injection systems, and thermal reactors; carburetor dash pots, EFEs, throttle position sensors, and choke systems.</li> <li>✓ Knowledge of fuel injection systems, of their components, and of how to recognize faulty components.</li> <li>✓ Knowledge of tampering, i.e., of what components or systems are likely to be altered or disabled and of how to recognize overt tampering when it is present.</li> <li>✓ Ability to determine whether any component of a vehicle's required emission control or related equipment is missing, modified, disconnected, or tampered with.</li> <li>✓ Ability to detect covert engine changes and other hidden modifications that prevent correct emissions testing.</li> </ul>

## VII. PERFORMING FUNCTIONAL TESTS (8.2%)

This area assesses the candidate's ability to use correct procedures for testing the functional operation of emissions-related components.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"><li>✓ Check whether the malfunction indicator light (MIL/Check Engine light) (a) functions properly and (b) has or has not come on during the emissions test.</li><li>✓ Obtain the trouble codes that caused the MIL to come on.</li><li>✓ Interpret the trouble codes.</li><li>✓ Check whether the maintenance-required light functions properly.</li><li>✓ Inspect the fuel cap for proper fit and ability to hold pressure, following the prompts of the BAR analyzer.</li><li>✓ As needed, test the gasoline fill-pipe restrictor with a dowel to verify that it will not accept a leaded-gasoline nozzle.</li><li>✓ As prompted, check the ignition timing.</li><li>✓ As prompted by the analyzer, check the integrity and functioning of the exhaust gas recirculation (EGR) system.</li></ul>	<ul style="list-style-type: none"><li>✓ Ability to check that vehicular warning lights, e.g., the MIL, function properly.</li><li>✓ Ability to obtain diagnostic trouble codes, e.g., when the MIL comes on.</li><li>✓ Ability to interpret diagnostic trouble codes and respond appropriately.</li><li>✓ Ability to choose the correct adapter and run the functional pressure test on a vehicle's fuel cap when prompted by the analyzer.</li><li>✓ Knowledge of the purpose of a fill-pipe restrictor and of the dowel test.</li><li>✓ Knowledge of where to obtain correct engine timing specifications, if necessary, for a vehicle undergoing a smog check.</li><li>✓ Ability to determine whether the timing of a particular vehicle is adjustable.</li><li>✓ Ability to check engine timing if the analyzer requires the check, i.e., ability to use a timing light correctly.</li><li>✓ Ability to correct engine timing as needed, if the timing is adjustable.</li><li>✓ Knowledge of the older and newer types of EGR, e.g., knowledge that OBD-II vehicles usually have digital electronic EGRs.</li><li>✓ Knowledge of where to obtain correct EGR specifications, if necessary, for a vehicle undergoing a smog check, i.e., knowledge of the data available from the under-hood label and from other BAR-approved sources.</li><li>✓ Knowledge of how EGRs operate, e.g., that some operate only if the vehicle is operating at speed, and that it may be necessary to test drive such a vehicle and use a gauge to record the EGR's vacuum signal.</li><li>✓ Knowledge of the various procedures—e.g., manipulating the valve, applying vacuum, overriding the computer—for checking a vehicle's EGR system.</li><li>✓ Ability to interpret functional-test failures and report them correctly to the analyzer.</li></ul>

## VIII. DIAGNOSING TEST FAILURES (14.5%)

This area assesses the candidate's ability to check emissions and non emission-related vehicle components in order to determine the cause of a vehicle's failure to pass the emissions test.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"><li>✓ Check the VIR for causes of failure which may be related to the visual inspections, functional tests or emissions tests.</li><li>✓ Determine whether a system failure is due to tampering, e.g., check whether emission control components have been tampered with in ways hidden from visual inspection.</li><li>✓ Determine which emissions are out of range (if any) and decide which system or systems may be at fault.</li><li>✓ Following manufacturer's procedures, check for trouble codes that implicate particular systems.</li></ul>	<ul style="list-style-type: none"><li>✓ Knowledge of how a four-stroke engine produces its various emissions.</li><li>✓ Knowledge of basic diagnostic principles, as set forth in the Clean Air Car Course, i.e., knowledge of how to interpret diagnostic checks and tests.</li><li>✓ Knowledge of the theory underlying each component of emission control systems, i.e., of what the component does and how and why it does it.</li><li>✓ Knowledge of diagnostic approaches to vehicles that lack OBD equipment.</li><li>✓ Ability to use all senses in diagnosis, e.g., to realize from the appearance and odor of a car's exhaust that it has a blown head gasket, that a particular engine sound implies that the engine is about to throw a connecting rod</li><li>✓ Knowledge that a vehicle test failure may be related to visual inspection, functional tests, or emissions, as indicated by the VIR.</li></ul>

## VIII. DIAGNOSING TEST FAILURES (14.5%)

*continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Check input sensors to determine whether they function properly.</li> <li>✓ Check computer outputs to determine whether any are abnormal.</li> <li>✓ Check for mechanical failures that affect emissions, e.g., a faulty valve train, leaking head gaskets, worn rings or pistons.</li> <li>✓ Check for EVAP system failures.</li> <li>✓ Using a laboratory oscilloscope, verify O<sub>2</sub> sensor operation and check its output for fuel control.</li> <li>✓ Make checks as needed if excessive HC emissions were the cause of failure.</li> <li>✓ Make checks as needed if excessive CO emissions were the cause of failure.</li> <li>✓ Make checks as needed if CO<sub>2</sub> or O<sub>2</sub> emissions were out of range.</li> <li>✓ Check the maintenance of systems that need periodic maintenance, e.g., ignition systems, systems that require filters.</li> <li>✓ Using a DVOM's minimum, maximum, and average readings, determine whether a vehicle is running in closed loop.</li> <li>✓ Resolve conflicts among diagnostic readings, especially those that suggest one component failure is causing other systems to indicate failures that may not be real.</li> <li>✓ Check appropriate references for information that will aid in diagnosis.</li> <li>✓ Pretest a vehicle that failed its smog check at another shop to establish a baseline.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of how missing, modified, disconnected, damaged, plugged, deteriorated, or corroded components affect the functioning of the systems of which they are parts, e.g., of how emissions are affected by the components' flaws.</li> <li>✓ Knowledge of whether particular kinds of tampering do or do not affect the MIL of a computer control system.</li> <li>✓ Ability to detect covert tampering with emissions-control or emissions-related components.</li> <li>✓ Ability to use the pattern of a failed vehicle's emissions readings as a guide to the vehicular system or systems that are probably at fault.</li> <li>✓ Ability to use a scan tool to check input sensor functioning and to obtain diagnostic trouble codes.</li> <li>✓ Knowledge of when to use particular diagnostic equipment.</li> <li>✓ Knowledge of approved sources of help in interpreting trouble codes and in detecting false codes.</li> <li>✓ Ability to use a lab scope to check the basic input/output functioning of a vehicle's sensors and computer.</li> <li>✓ Knowledge that checking and interpreting the condition of the engine oil is basic to understanding emissions-related failures, e.g., diluted with gasoline.</li> <li>✓ Knowledge that checking and interpreting engine timing is basic to understanding emissions-related failures.</li> <li>✓ Knowledge that understanding ignition systems is basic to understanding emissions failures.</li> <li>✓ Knowledge of innovations, e.g., of distributorless ignition systems, of electrically driven air injection systems, of how they operate, and of how they fail.</li> <li>✓ Knowledge of normal emissions readings for a vehicle in good condition.</li> <li>✓ Knowledge of the diagnostic checks needed if a vehicle fails for excessive HC emissions.</li> <li>✓ Knowledge of the diagnostic checks needed if a vehicle fails for excessive CO emissions.</li> <li>✓ Knowledge of the systems that may be implicated if O<sub>2</sub> and CO<sub>2</sub> emissions readings are out of range and of the diagnostic checks that should be made.</li> <li>✓ Ability to judge from a test drive what may be causing a vehicle to fail, i.e., ability to identify sounds, odors, or vibrations that implicate particular systems.</li> <li>✓ Knowledge of how to locate and use diagnostic aids, e.g., emissions pattern charts, trouble trees, vacuum diagrams, wiring diagrams, cross-references that relate voltages to temperatures.</li> <li>✓ Ability to identify the causes of wiring defects, e.g., excessive heat, vibration, or dampness, gnawing by rodents.</li> <li>✓ Knowledge of how to use automotive manuals and CD-based, DVD-based, or on-line references in diagnosing smog check failures.</li> <li>✓ Knowledge of how neglecting preventive maintenance causes problems, such as arcing plug wires or clogged filters, that affect emissions.</li> <li>✓ Knowledge of frequent causes of failure, e.g., clogged EGR passages, faulty temperature sensors that cause EGR valves to open or close when they shouldn't, defective O<sub>2</sub> sensors, defective AIS diverter valves.</li> <li>✓ Ability to test whether sensors are working properly, i.e., ability to use DVOMs and DSOs to assess their functioning.</li> <li>✓ Ability to use basic diagnostic equipment, e.g., oscilloscopes, timing lights and scan tools, and specialized equipment, e.g., mirrors for locating multiple O<sub>2</sub> sensors.</li> <li>✓ Knowledge of the causes of engine misfires, e.g., knowledge that any source of unmetered outside air, such as leaking vacuum brake boosters, may cause lean misfires.</li> <li>✓ Ability to use an oscilloscope to identify the causes of misfires, e.g., faulty coils, modules, or reluctors.</li> </ul>

**VIII. DIAGNOSING TEST FAILURES (14.5%)***continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
	<ul style="list-style-type: none"><li>✓ Knowledge that in pre-OBD-II cars, MAP and mass airflow sensors may not set trouble codes under out of specification conditions.</li><li>✓ Knowledge of how to adjust electronic carburetors.</li><li>✓ Knowledge of where AIS-controlled air should go and of what proportions are normal for different destinations.</li><li>✓ Ability to use the propane enrichment procedure to locate vacuum leaks, e.g., those that cause lean misfires.</li><li>✓ Ability to use a lab scope for sensor testing or to monitor an O<sub>2</sub> sensor's function.</li><li>✓ Knowledge that misfires can lead to catalytic-converter failure.</li><li>✓ Knowledge of tests of catalytic-converter function, e.g., the oxygen absorption test, the cranking CO test, the intrusive test, and the infrared pyrometer test, and of how to perform them.</li><li>✓ Ability to use a pyrometer to determine which converter in a multiple-converter system is faulty.</li><li>✓ Knowledge of, or ability to determine, how much resistance is required in a secondary ignition system.</li><li>✓ Ability to perform a "cylinder balance (rpm drop)" test to determine whether a cylinder is functional.</li><li>✓ Ability to perform compression and leak-down tests.</li><li>✓ Knowledge of the possible causes of a "dead" cylinder—one that fails to ignite during engine operation.</li><li>✓ Knowledge of how abnormal fuel pressures affect emissions.</li><li>✓ Knowledge that a restricted fuel return line increases injection pressure and affects emissions.</li><li>✓ Knowledge of sequential or cascading failures, e.g., that a faulty ground may cause multiple sensor failures.</li><li>✓ Ability to perform "voltage drop" tests to locate a wiring defect.</li><li>✓ Knowledge that O<sub>2</sub> emissions readings are critical to lean-mixture diagnoses.</li><li>✓ Knowledge that an excessively rich mixture may be due to a faulty O<sub>2</sub> sensor.</li><li>✓ Knowledge that the switch rate of the O<sub>2</sub> sensor during closed-loop operation will reveal whether the computer is controlling fuel delivery.</li><li>✓ Ability to use a scan tool, lab scope, DVOM, or voltmeter as needed to determine why fuel control is defective.</li><li>✓ Ability to perform and interpret engine computer systems tests.</li><li>✓ Ability to use a charging-systems tester in diagnosis.</li><li>✓ Ability to determine actual engine temperatures and to correct unacceptable temperatures.</li><li>✓ Knowledge that components that appear to require replacement should be tested before a replacement is made.</li><li>✓ Knowledge that simply replacing a catalytic converter instead of diagnosing the true cause(s) of excessive emissions will mask the cause(s) and lead to early converter failure.</li><li>✓ Knowledge of, or ability to find, correct procedures for repairing older vehicles, e.g., the procedure for repairing the mechanical advance in the distributor of a vehicle so equipped.</li></ul>

## IX. PERFORMING AND VERIFYING REPAIRS (14.2%)

This area assesses the candidate's ability to repair and/or replace faulty vehicle components, and to bring vehicle components within correct operating specifications.

BASIC TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Use references to estimate repair costs.</li> <li>✓ Use references to guide repairs, e.g., use vacuum diagrams, wiring diagrams, component locators, emission parts locators.</li> <li>✓ Research whether a repair, such as a manufacturer's recall, is available for a vehicle.</li> <li>✓ Replace a faulty computer-input sensor, e.g., an O<sub>2</sub> sensor, a MAP sensor, a mass airflow sensor.</li> <li>✓ Clean and repair or replace electrical wiring that has deteriorated or has been disconnected by vibration, burned, or chewed by rodents.</li> <li>✓ Repair wiring problems that affect the vehicle's computer or OBD-II system, e.g., faulty grounds to sensors.</li> <li>✓ Repair vacuum lines that have deteriorated or split, e.g., under thermal stress.</li> <li>✓ Repair ignition system, e.g., replace spark plugs, reconnect plug wires, correct secondary ignition problems.</li> <li>✓ Correct a timing belt malfunction, i.e., adjust, repair, or replace the belt.</li> <li>✓ Eliminate "voltage drop" problems from electrical systems.</li> <li>✓ Repair a malfunctioning EGR system, e.g., clear clogged passages, replace a faulty EGR valve or faulty EGR control system.</li> <li>✓ Repair an intake manifold leak.</li> <li>✓ Repair the AIS, e.g., replace faulty air-switching valves or faulty check valves.</li> <li>✓ Correct a cooling system problem, e.g., clear or replace a plugged radiator, replace a faulty thermostat, replace the fan belt, repair coolant leaks, replace a water pump.</li> <li>✓ Correct a fuel system problem, e.g., overhaul a carburetor, clean or replace fuel injectors, replace a restricted fuel line, replace a faulty pressure regulator.</li> <li>✓ Reroute vacuum hoses that have been installed incorrectly and repair or replace hoses that have been damaged.</li> <li>✓ Perform a cylinder balance test.</li> <li>✓ Clean the throttle plate and any auxiliary speed control device.</li> <li>✓ Verify that repaired components operate properly.</li> <li>✓ Retest a vehicle with repaired components to verify the success of the repairs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of the use of tools and equipment mandated for use in emissions control repairs, e.g., timing lights, fuel cap testers.</li> <li>✓ Knowledge of how a system that requires repair functions, i.e., of how and why it works when in good repair.</li> <li>✓ Ability to recognize or otherwise identify a defective component in need of cleaning, repair, or replacement, e.g., to recognize that the wrong type of spark plug has been installed.</li> <li>✓ Knowledge of disassembly procedures needed to perform emissions-related repairs.</li> <li>✓ Knowledge that common emissions control repairs involve: O<sub>2</sub> sensors; mass airflow sensors; air injection systems; catalytic converters; EGR systems; spark plugs or ignition system wiring; other electrical-circuit components; timing components; exhaust systems; fuel pressure regulators; fuel caps.</li> <li>✓ Knowledge of how to use references—printed manuals, CD-based, DVD-based, and on-line databases—to obtain repair instructions.</li> <li>✓ Ability to interpret and follow the repair instructions in standard repair references, e.g., to use wiring diagrams, vacuum routing diagrams.</li> <li>✓ Knowledge of how to replace a failed sensor and reset the vehicle's computer to accommodate the new sensor.</li> <li>✓ Knowledge that cleaning EGR passages and ports may be routinely required for some failed vehicles, e.g., high-mileage vehicles, older cars with rotary engines.</li> <li>✓ Ability to repair an EGR system, e.g., to clear its passages and ports, to replace a defective EGR valve.</li> <li>✓ Ability to repair or replace a leaking intake or exhaust manifold.</li> <li>✓ Ability to repair cooling systems, e.g., to replace a faulty thermostat, to clear or replace a plugged radiator, to replace a failed coolant sensor.</li> <li>✓ Ability to repair fuel systems, e.g., to repair or replace a faulty fuel pump, to replace a faulty fuel injector, to overhaul a carburetor, to recognize and replace a faulty fuel cap.</li> <li>✓ Ability to repair an AIS, e.g., to ensure that the diverter valve switches properly and routes air correctly.</li> <li>✓ Ability to replace catalytic converters, e.g., to choose the correct converter for the repair, to orient particular types of converter correctly, to prevent exhaust leaks at the converter.</li> <li>✓ Ability to replace deteriorated vacuum hoses and to route and connect the new hoses correctly.</li> <li>✓ Ability to repair electrical circuitry, e.g., to route wires correctly, to make correct connections with wire of the correct gauge, to follow color codes as needed.</li> <li>✓ Ability to perform valve train repairs, e.g., to replace valves, valve lifters, or valve springs as needed, to regrind valve seats.</li> </ul>

**IX. PERFORMING AND VERIFYING  
REPAIRS (14.2%)**

*continued*

BASIC TASKS	ASSOCIATED KNOWLEDGE
	<ul style="list-style-type: none"> <li>✓ Knowledge that technicians should avoid prolonged cylinder balance tests, which overheat catalytic converters.</li> <li>✓ Knowledge of how to clean away corrosion without causing further damage to automotive components.</li> <li>✓ Knowledge of procedures for verifying that the thermostatic air cleaner operates properly.</li> <li>✓ Ability to use diagnostic equipment—scan tool, oscilloscopes, hand vacuum pump, vacuum gauge, compression gauge, fuel-pressure gauge, propane enrichment equipment, an exhaust analyzer, and the like—to verify the success of a repair.</li> <li>✓ Knowledge of the value of multiple tests that produce mutually confirming results concerning the success of repairs,</li> <li>✓ Knowledge that an emissions test will verify the success of a catalytic converter replacement.</li> <li>✓ Knowledge that manual-mode emissions testing allows a technician to observe the effectiveness of repairs.</li> </ul>

## ADVANCED EMISSION TECHNICIAN EXAMINATION PLAN

The following is the examination plan for the **Advanced Emission Technician** examination, which is the detailed information used by Subject Matter Experts to write examination questions.

### I. DISCHARGING OBLIGATIONS TO CONSUMERS (15.3%)

This area assesses the candidate's ability to communicate current laws and regulations regarding emissions tests to consumers, such that consumers will understand what is required, why it is required, and what their options are.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Determine what type of smog check a consumer needs, e.g., biennial, change of ownership, after-repair, initial registration, out-of-state vehicle.</li> <li>✓ Educate a customer regarding the need or lack of need to test a vehicle, e.g., point out that it must be tested before it can be sold, that it is too old or too new to require testing.</li> <li>✓ Determine whether a customer's vehicle must be tested at a test-only station, explain the need if necessary, and provide the BAR 800 number or a list of stations near by.</li> <li>✓ Explain to a customer why a test-only station does not perform repairs.</li> <li>✓ Determine whether a vehicle must be tested at a referee station, explain the need if necessary, and refer the vehicle.</li> <li>✓ Explain "gross polluter" to a customer.</li> <li>✓ Explain to a customer why a vehicle must be tested at a station authorized to certify gross-polluter vehicles.</li> <li>✓ Explain smog check failures due to tampering and tampering's possible effects on emissions and driveability.</li> <li>✓ Obtain a customer's authorization to perform a smog check.</li> <li>✓ Inform a customer of incidental findings concerning a vehicle's need for repair, e.g., report problems that affect safety.</li> <li>✓ Explain the value of a pretest when a pretest is appropriate.</li> <li>✓ Inform a customer of a repair needed to make the vehicle safe to test and, if appropriate, provide a cost estimate.</li> <li>✓ Inform a customer of unintentional tampering that would cause the vehicle to fail.</li> <li>✓ After emissions testing print out two copies of the VIR, sign and date them, file one, and give one to the customer.</li> <li>✓ Obtain authorization for diagnostic testing and provide the customer with a cost estimate.</li> <li>✓ Determine what repairs within the cost minimum will bring about the greatest reduction in emissions.</li> <li>✓ Obtain authorization for repairs needed to bring a failed vehicle into compliance and provide the customer with a cost estimate.</li> <li>✓ Obtain customer authorization when a repair changes and the original estimate requires revision.</li> <li>✓ Obtain customer authorization to replace components near the end of their useful life when significant other repairs are being made.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of the laws and regulations requiring vehicles to undergo emissions tests, e.g., Knowledge that some vehicles require no testing, that a change of ownership requires certification for which the seller is responsible.</li> <li>✓ Knowledge of the test-only program, of how vehicles are chosen to participate, and of why particular vehicles are chosen.</li> <li>✓ Knowledge that a technician may provide a list of near-by stations of the type that a customer needs to visit but may not recommend one.</li> <li>✓ Knowledge of why a test-only station does not perform repairs.</li> <li>✓ Knowledge of the conditions that require or allow a vehicle to be sent to a referee station and, especially, when not to send a vehicle to a referee station.</li> <li>✓ Ability to judge whether an emissions pretest is advisable and to explain its advisability to the customer.</li> <li>✓ Ability to determine from a pretest whether a particular vehicle would fail its emissions test as a gross polluter.</li> <li>✓ Knowledge that a gross polluter must be tested at a station authorized to certify it.</li> <li>✓ Knowledge of the circumstances in which no cost minimum applies to repairs needed to make a failed vehicle legally usable.</li> <li>✓ Knowledge of myths about emissions control equipment that prevail among consumers and of why they are myths.</li> <li>✓ Knowledge of tampering, of its effects on emissions, and of the laws, regulations, and BAR policies concerning it.</li> <li>✓ Knowledge that warning a customer about potential vehicle systems failures is both professional behavior and good business.</li> <li>✓ Ability to determine whether a repair is needed before emissions testing.</li> <li>✓ Ability to prepare lawful estimates for the costs of diagnoses and repairs or to provide information for such estimates to service writers.</li> <li>✓ Ability to explain to a customer why diagnostic tests are needed.</li> <li>✓ Knowledge of the legal \$450 repair cost minimum and of how it applies to correcting vehicle failures.</li> <li>✓ Knowledge of diagnoses and repairs that optimize value to customers, e.g., That bring about the best reductions in emissions possible within the \$450 repair cost minimum.</li> </ul>

## I. DISCHARGING OBLIGATIONS TO CONSUMERS (15.3%)

*continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Inform a consumer of the legal \$450 repair cost minimum and of the circumstances in which it applies.</li> <li>✓ Inform a customer of possible warranty coverage for repairs.</li> <li>✓ Explain to the customer the importance of after-repairs testing.</li> <li>✓ Fully disclose to the customer the costs of all recommended procedures, e.g., test, repair, retest.</li> <li>✓ Provide the customer with a detailed invoice concerning diagnoses and repairs.</li> <li>✓ Create repair records when appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of alternate routes to qualifying vehicles for use, e.g., knowledge of the circumstances in which a customer and vehicle qualify for a waiver or help from the state with repair costs.</li> <li>✓ Knowledge of vehicle warranties required by State and Federal law and of how to find warranties for particular vehicles.</li> <li>✓ Knowledge of the relationships between controlling CO or HC emissions and making NOx emissions worse.</li> <li>✓ Ability to explain to a customer why verifying the effectiveness of repairs is necessary.</li> <li>✓ Ability to provide a customer with lawful, detailed invoices concerning diagnoses and repairs or to furnish the necessary information for such invoices to service writers.</li> <li>✓ Knowledge of how to locate hard-to-find repair parts and how to guide a customer through a proper sequence—local stores, manufacturers, wrecking yards, parts locators—for finding them.</li> </ul>

## II. IDENTIFYING THE VEHICLE TO BE TESTED (10.7%)

This area assesses the candidate's ability to verify that the vehicle presented for testing is the vehicle identified in the owner, vehicle and registration information, as well as to identify and verify that the vehicle is equipped with all required and/or authorized emissions, engine, power train, etc. equipment.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Verify the presence or absence of a VIN label and its accuracy, if present.</li> <li>✓ Determine whether a DMV notice correctly identifies the vehicle; e.g., determine that DMV made no errors in its ID number or license number.</li> <li>✓ Verify that the vehicle's VIN and odometer mileage match their counter-parts in the DMV renewal notice, service writer's work order, or other documentation concerning the prospective test.</li> <li>✓ Check the owner's zip code to verify that the vehicle has been presented for testing in an appropriate testing area.</li> <li>✓ Check that the year, make, and model of the vehicle to be tested match its description in the documents concerning it.</li> <li>✓ Check the engine, power train, and other equipment of the vehicle to determine its identity and check that these components are original equipment or permitted substitutes.</li> <li>✓ Determine the presence or absence of vehicle emission labels and their accuracy.</li> <li>✓ Verify that the under-hood emissions label and any BAR label (a) belong on the vehicle to be tested and (b) help confirm its identity.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to determine from the owner's zip code whether a vehicle is being presented for testing in an appropriate testing area.</li> <li>✓ Knowledge of the information about a vehicle that its VIN contains.</li> <li>✓ Knowledge that DMV renewal notices, repair orders, or other documentation may contain errors in VINs or license plate numbers; i.e., that the vehicle itself is the first source for identification.</li> <li>✓ Knowledge, for both common and specialized vehicles, of where to find standard labels related to smog checks, of how to access and interpret the information they contain, and of how to use them, if necessary, to confirm the vehicle's identity.</li> <li>✓ Knowledge that a vehicle may have a replacement hood or radiator support bearing a label issued to a different vehicle.</li> <li>✓ Ability to use a manufacturer's manual or ECS applications guide to identify required emissions control equipment in the absence of a correct, legible label, or to determine that a vehicle was not built to meet California emissions control requirements.</li> <li>✓ Knowledge that vehicles not equipped to meet California or federal emissions standards must be sent to a referee station for testing.</li> </ul>

## II. IDENTIFYING THE VEHICLE TO BE TESTED (10.7%)

*Continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Determine from the under-hood label whether a vehicle was built for use in California, the other 49 states, Canada, or elsewhere outside the United States; i.e., whether it was intended to meet California emissions specifications.</li> <li>✓ Refer a specially constructed vehicle, a vehicle with an engine change, or any other vehicle that must go elsewhere for testing.</li> <li>✓ Obtain the gross vehicle weight rating of the vehicle to be tested and determine what emissions test is appropriate.</li> <li>✓ Use the under-hood emissions label, a manufacturer's manual, or an applications manual to determine a vehicle's required emission control components.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of the information to use—e.g., year, make, model, state or province of licensure, odometer mileage, engine configuration, type of drive train, type of computer, emissions control equipment—in confirming the identity given by VIN, license plate, labels, and documents concerning the vehicle.</li> <li>✓ Ability to use references that supply information about how particular vehicles are configured and equipped, e.g., to use an electronic reference to obtain a printout concerning a vehicle's required emission control equipment.</li> <li>✓ Knowledge of gray-market vehicles, of how to identify them from their VINs and emissions control equipment, and of how to respond when they are presented for testing.</li> <li>✓ Knowledge that specially constructed vehicles need a BAR referee label.</li> </ul>

## III. INSPECTING THE VEHICLE TO BE TESTED FOR SAFETY (3.5%)

This area assesses the candidate's ability to identify and determine whether the vehicle presented for testing has any conditions that would render any emissions testing problematic and/or unsafe.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Visually check a vehicle presented for testing, looking for fluid leaks, excessive tire wear, frayed fan belts, weakened radiator hoses, or other conditions that may render it unsafe to test.</li> <li>✓ Safety-check a vehicle presented for testing, checking for indicator lights, exhaust smoke or vapor, and sounds, odors, vibrations, or other conditions, such as a slipping clutch or faulty brakes, that indicate need for repairs before testing.</li> <li>✓ With customer authorization, correct quickly correctable conditions—e.g., underinflated tires; insufficient oil, coolant, transmission fluid, or brake fluid—that should be corrected before testing.</li> <li>✓ If a vehicle requires BAR 97 testing determine whether the traction control, if present, can be disengaged and how to disengage it, and determine whether all-wheel drive, if present, can be disengaged and how to disengage it.</li> <li>✓ Verify that a vehicle prepared for dynamometer testing has been properly positioned and secured.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of references that detail what engines and power trains are appropriate to a vehicle of a particular year, make, and model.</li> <li>✓ Knowledge of references that detail what emission control components are required or permitted on a vehicle of a particular year, make, and model.</li> <li>✓ Knowledge that systems approved for a vehicle of a particular make may not be approved for a vehicle of a different make, even though the two systems are very similar or identical.</li> <li>✓ Ability to determine whether any component of a vehicle's required emission control or related equipment is missing, modified, disconnected, or tampered with.</li> <li>✓ Ability to detect covert engine changes and other hidden modifications that prevent correct emissions testing.</li> <li>✓ Ability to determine whether a vehicle's fluid levels will permit safe testing and to correct them if correcting them is feasible.</li> <li>✓ Knowledge of vehicle conditions that would render BAR 97 emissions testing problematic or unsafe.</li> <li>✓ Knowledge of vehicle conditions that would render any emissions testing problematic or unsafe.</li> <li>✓ Ability to determine from inspection or a test drive whether a vehicle can be tested safely.</li> </ul>

#### **IV. CALIBRATING, MAINTAINING AND SERVICING THE ANALYZER (6.8%)**

This area assesses the candidate's ability to interpret and respond to analyzer prompts, to identify and troubleshoot routine system malfunctions and to perform required analyzer service procedures.

<b>ADVANCED TASKS</b>	<b>ASSOCIATED KNOWLEDGE</b>
<ul style="list-style-type: none"> <li>✓ Respond to analyzer maintenance prompts, e.g., a prompt for calibration.</li> <li>✓ Perform a 3-day gas calibration on a BAR 90 analyzer.</li> <li>✓ Perform a 3-day gas calibration on a BAR 97 analyzer and inspect and calibrate the dynamometer.</li> <li>✓ Visually inspect analyzer devices, e.g., check for broken flex probe, kinked or deteriorated sample hose, dirty filters, plugged water trap drain.</li> <li>✓ Repair or replace defective components, e.g., hoses, flex probe, tach leads, filters, as needed.</li> <li>✓ Respond to failure prompts, e.g., purge HC hang-ups, correct analyzer lock-ups.</li> <li>✓ Determine whether analyzer failures are caused by computer lock-outs and take corrective action.</li> <li>✓ Troubleshoot a printer failure that occurs without failure prompt; i.e., check and correct paper jams.</li> <li>✓ Identify and troubleshoot system malfunctions, e.g., low flow through the sample hose, sample dilution, failure of a dynamometer or fuel cap tester to communicate with the analyzer.</li> <li>✓ Call the manufacturer's representative to make internal analyzer repairs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to interpret and respond to analyzer maintenance prompts.</li> <li>✓ Knowledge of how to perform a gas calibration on a BAR 90 analyzer.</li> <li>✓ Knowledge of how to perform a gas calibration on a BAR 97 analyzer and of how to calibrate the dynamometer.</li> <li>✓ Ability to determine whether analyzer devices—e.g., probe tips, sample hose, filters, water trap drain—are functioning correctly.</li> <li>✓ Knowledge of how to check the operation of the fuel cap tester.</li> <li>✓ Ability to repair or replace defective external components of an analyzer.</li> <li>✓ Ability to respond effectively to an analyzer's failure prompts, e.g., HC hang-ups, low flow, analyzer lock-ups.</li> <li>✓ Ability to troubleshoot an analyzer's printer problems, e.g., paper jams, exhausted ink cartridges.</li> <li>✓ Ability to troubleshoot minor analyzer system malfunctions, e.g., low flow, sample dilution, failure of the fuel cap tester or dynamometer to communicate with the analyzer.</li> <li>✓ Knowledge of the causes of analyzer lock-outs and how to restore normal operation.</li> <li>✓ Knowledge of how and when to reset and refresh an analyzer.</li> <li>✓ Knowledge of how and when to obtain parts and supplies to maintain an analyzer.</li> <li>✓ Knowledge of when and how to add or delete a technician access code through BAR.</li> </ul>

#### **V. PREPARING FOR AND SAFELY CONDUCTING EMISSIONS TESTS (15.8%)**

This area assesses the candidate's ability to inspect the vehicle to be tested, the testing area and the testing equipment in order to ensure and maintain a safe working environment.

<b>ADVANCED TASKS</b>	<b>ASSOCIATED KNOWLEDGE</b>
<ul style="list-style-type: none"> <li>✓ Ensure the testing area is safe, e.g., clear the area of loose tools, wipe up spills, exclude nonessential staff and customers.</li> <li>✓ Take precautions for personal and staff safety during the tests, e.g., run them from inside the vehicle, allow no one to work on the vehicle, avoid releasing pressurized fluids.</li> <li>✓ Follow the safety procedures recommended by vehicle and equipment manufacturers.</li> <li>✓ Start the vehicle and bring its engine to operating temperature.</li> <li>✓ As needed, pretest the vehicle, checking the fuel cap, timing, and EGR valve as well as the emissions.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of BAR 90 testing, i.e., of the information the analyzer requires and of how to supply it and respond to the analyzer's prompts.</li> <li>✓ Knowledge of BAR 97 testing, i.e., of the information the analyzer requires and of how to supply it and respond to the analyzer's prompts.</li> <li>✓ Knowledge of personal-safety precautions during emissions testing.</li> <li>✓ Knowledge of precautions that prevent damage to costly equipment, e.g., keeping vehicle fluids out of a dynamometer, removing the tailpipe probe and tachometer lead before moving a vehicle after testing.</li> <li>✓ Knowledge of when and how to use a vehicle's computer to disengage its traction control.</li> <li>✓ Knowledge of suitable restraints for all vehicles tested.</li> </ul>

## V. PREPARING FOR AND SAFELY CONDUCTING EMISSIONS TESTS (15.8%)

*Continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Enter vehicle information and inspection results as required by the BAR 90 or BAR 97 analyzer, i.e., identify yourself by license number and access code; scan the BAR code on the renewal form or identify the vehicle as prompted; enter the gross vehicle weight rating as prompted; and respond to prompts regarding engine and emission controls.</li> <li>✓ For BAR 97 testing, follow the prompts to disengage the traction control and/or all-wheel drive, if present.</li> <li>✓ Ensure that the vehicle is properly positioned over the lift plates for weighing.</li> <li>✓ For BAR 97 testing, weigh the vehicle so the BAR analyzer can calculate the horsepower load required for loaded-mode testing.</li> <li>✓ For BAR 97 testing, chock or ratchet-clamp the wheels of the non-driven axle and properly place the side restraints.</li> <li>✓ As prompted, position, plug in to the analyzer, and start a cooling fan to assist a vehicle's fan during BAR 97 testing.</li> <li>✓ As prompted, insert the tailpipe probe into the vehicle's exhaust system and attach the tachometer leads.</li> <li>✓ For BAR 97 testing, select a gear range that will help establish proper rpm and load.</li> <li>✓ Following the prompts of the BAR 97 analyzer, run the 15-mph emissions test.</li> <li>✓ Following the prompts of the BAR 97 analyzer, run the 25-mph emissions test.</li> <li>✓ Following the prompts of the BAR 90 analyzer, run the high-rpm test.</li> <li>✓ Following the prompts of the BAR 90 analyzer, run the idle rpm test.</li> <li>✓ If sample dilution occurs, locate and correct the cause, if possible, e.g., move the probe.</li> <li>✓ Abort a smog check when necessary.</li> <li>✓ Detach the tachometer leads and remove the tailpipe probe from the exhaust system before moving the vehicle out of the testing area.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of how to chock or ratchet-clamp non-driven wheels for emissions testing.</li> <li>✓ Knowledge that chocking is appropriate even for BAR 90 testing because an old vehicle may slip into gear.</li> <li>✓ Knowledge of how test procedures differ between BAR 90 testing and BAR 97 testing.</li> <li>✓ Knowledge of appropriate operating temperatures for a vehicle and its emission control components.</li> <li>✓ Ability to attach tachometer leads, properly place the tailpipe probe, and, for dual-exhaust vehicles, use the correct two-probe adapter.</li> <li>✓ Ability to distinguish dual-exhaust vehicles from those with two tailpipes after the muffler.</li> <li>✓ Knowledge of pretesting a vehicle so as to determine any need for repairs.</li> <li>✓ Ability to judge whether required maintenance, if indicated, will affect the vehicle's emissions.</li> <li>✓ Knowledge of how to help a BAR 97 analyzer determine vehicle weight for loaded-mode testing, i.e., knowledge that both axles of a vehicle may have to be weighed.</li> <li>✓ Knowledge that trying to steer a vehicle on dynamometer rollers may worsen its tendency to drift, that it will settle in at slow speed or after a shift to neutral.</li> <li>✓ Knowledge that testing must be done in the proper gear, e.g., that small-displacement cars (1.2 liters or less) should be tested in second gear with standard tires.</li> <li>✓ Knowledge of the need to avoid over-accelerating the engine when changing from 15 to 25 mph, i.e., knowledge that over-speeding and dropping back too much may cause the analyzer to abort the test.</li> <li>✓ Knowledge of when to abort problematic tests, e.g., when warning lights come on, when a substantial fluid leak occurs, when the engine pings or knocks, when the vehicle overheats or smokes.</li> <li>✓ Knowledge of where to insert the probe if sample dilution occurs.</li> <li>✓ Knowledge of checks to make if an engine fails to maintain proper rpm under a dynamometer load, e.g., of the need to check the transmission fluid level, the clutch, the tire sizes and tire condition.</li> </ul>

## **VI. PERFORMING VISUAL INSPECTIONS AS PROMPTED BY ANALYZER (13.8%)**

This area assesses the candidate's ability to locate, identify and check emissions components for proper condition and operation.

<b>ADVANCED TASKS</b>	<b>ASSOCIATED KNOWLEDGE</b>
<ul style="list-style-type: none"> <li>✓ Visually inspect the PCV system, checking valve, vacuum hose, and clean-air hose to the air cleaner.</li> <li>✓ Visually inspect the TAC system for vacuum line connection and installation of the pre-heat hose and heat stove.</li> <li>✓ Visually inspect the AIS, i.e., on a pulse air system, check the control valve, hoses, and plumbing; on a pump system, check the belt, pump, check valves, and controls.</li> <li>✓ Visually inspect the EVAP system, checking vapor canister, purge solenoids, vacuum hoses, and fuel lines.</li> <li>✓ Visually inspect the EGR system, checking valve, controls, and vacuum hoses(if used in the system).</li> <li>✓ Visually inspect the catalytic converter(s), i.e., check that any required converter is present and check it for damage.</li> <li>✓ Visually inspect input sensors, i.e., check that each sensor is present and that its connecting wires are intact.</li> <li>✓ Visually inspect other computer components, checking actuator, spark controls, and output wiring.</li> <li>✓ Visually inspect vacuum hoses, i.e., check their condition, routing, and connections.</li> <li>✓ Visually inspect the fuel injection system, checking pressure regulator, injectors, wiring, and leaks</li> <li>✓ Visually inspect other emissions-related equipment, e.g., EFE, heat risers, anti-dieseling solenoids, choke controls, deceleration controls.</li> <li>✓ Verify whether a vehicle's required emission control components are present, unmodified, free of tampering, and properly connected.</li> <li>✓ Verify that a vehicle's emission control components are appropriate to its year, make, and model or are permitted substitutes for original equipment.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Ability to check the PCV system, system operation, and related components and recognize component failures.</li> <li>✓ Ability to check air cleaner installation, condition, and operation and recognize component failures.</li> <li>✓ Knowledge of TAC function and correct TAC operation.</li> <li>✓ Ability to check the vacuum controls of a TAC.</li> <li>✓ Knowledge of how an AIS operates, where and when air injection occurs, and how to recognize system failures.</li> <li>✓ Knowledge of how to locate EVAP components and how to recognize component failures.</li> <li>✓ Ability to locate and identify a vehicle's EGR valve.</li> <li>✓ Knowledge of EGR system components and of how to recognize component failures.</li> <li>✓ Ability to locate a vehicle's catalytic converter(s), identify different types of converter, and recognize damage.</li> <li>✓ Ability to locate, identify, and evaluate the condition of computer input sensors, connectors, and wiring, using references as needed.</li> <li>✓ Ability to locate and evaluate computer output devices, connectors, and wiring.</li> <li>✓ Ability to locate and use vacuum hose routing diagrams to check hose routing and installation as well as to check hose condition.</li> <li>✓ Ability to identify approved, emissions-related changes and replacements, e.g., intake and exhaust manifolds, injection systems, and thermal reactors; carburetor dash pots, EFEs, throttle position sensors, and choke systems.</li> <li>✓ Knowledge of fuel injection systems, of their components, and of how to recognize faulty components.</li> <li>✓ Knowledge of tampering, i.e., of what components or systems are likely to be altered or disabled and of how to recognize overt tampering when it is present.</li> </ul>

## VII. PERFORMING FUNCTIONAL TESTS (6.9%)

This area assesses the candidate's ability to use correct procedures for testing the functional operation of emissions-related components.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"><li>✓ Check whether the malfunction indicator light (MIL/Check Engine light) (a) functions properly and (b) has or has not come on during the emissions test.</li><li>✓ Obtain the trouble codes that caused the MIL to come on.</li><li>✓ Interpret the trouble codes.</li><li>✓ Check whether the maintenance-required light functions properly.</li><li>✓ Inspect the fuel cap for proper fit and ability to hold pressure, following the prompts of the BAR analyzer.</li><li>✓ As needed, test the gasoline fill-pipe restrictor with a dowel to verify that it will not accept a leaded-gasoline nozzle.</li><li>✓ As prompted, check the ignition timing.</li><li>✓ As prompted by the analyzer, check the integrity and functioning of the exhaust gas recirculation (EGR) system.</li></ul>	<ul style="list-style-type: none"><li>✓ Ability to check that vehicular warning lights, e.g., the MIL, function properly.</li><li>✓ Ability to obtain diagnostic trouble codes, e.g., when the MIL comes on.</li><li>✓ Ability to interpret diagnostic trouble codes and respond appropriately.</li><li>✓ Ability to choose the correct adapter and run the functional pressure test on a vehicle's fuel cap when prompted by the analyzer.</li><li>✓ Knowledge of the purpose of a fill-pipe restrictor and of the dowel test.</li><li>✓ Knowledge of where to obtain correct engine timing specifications, if necessary, for a vehicle undergoing a smog check.</li><li>✓ Ability to determine whether the timing of a particular vehicle is adjustable.</li><li>✓ Ability to check engine timing if the analyzer requires the check, i.e., ability to use a timing light correctly.</li><li>✓ Ability to correct engine timing as needed, if the timing is adjustable.</li><li>✓ Knowledge of the older and newer types of EGR, e.g., knowledge that OBD-II vehicles usually have digital electronic EGRs.</li><li>✓ Knowledge of where to obtain correct EGR specifications, if necessary, for a vehicle undergoing a smog check, i.e., knowledge of the data available from the under-hood label and from other BAR-approved sources.</li><li>✓ Knowledge of how EGRs operate, e.g., that some operate only if the vehicle is operating at speed, and that it may be necessary to test drive such a vehicle and use a gauge to record the EGR's vacuum signal.</li><li>✓ Knowledge of the various procedures—e.g., manipulating the valve, applying vacuum, overriding the computer—for checking a vehicle's EGR system.</li><li>✓ Ability to interpret functional-test failures and report them correctly to the analyzer.</li></ul>

## VIII. DIAGNOSING TEST FAILURES (13.7%)

This area assesses the candidate's ability to check emissions and non emission-related vehicle components in order to determine the cause of a vehicle's failure to pass the emissions test.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"><li>✓ Check the VIR for causes of failure which may be related to the visual inspections, functional tests or emissions tests.</li><li>✓ Using the VIR, determine in which part of the test (e.g., high rpm, idle or 50/15, 25/25) the emissions were too high and use the finding in diagnosis.</li><li>✓ Determine whether a system failure is due to tampering, e.g., check whether emission control components have been tampered with in ways hidden from visual inspection.</li></ul>	<ul style="list-style-type: none"><li>✓ Knowledge of how a four-stroke engine produces its various emissions.</li><li>✓ Knowledge of basic diagnostic principles, as set forth in the Clean Air Car Course, i.e., knowledge of how to interpret diagnostic checks and tests.</li><li>✓ Knowledge of the theory underlying each component of emission control systems, i.e., of what the component does and how and why it does it.</li><li>✓ Knowledge of diagnostic approaches to vehicles that lack OBD equipment.</li><li>✓ Ability to use all senses in diagnosis, e.g., to realize from the appearance and odor of a car's exhaust that it has a blown head gasket, that a particular engine sound implies that the engine is about to throw a connecting rod</li><li>✓ Knowledge that a vehicle test failure may be related to visual inspection, functional tests, or emissions, as indicated by the VIR.</li></ul>

## VIII. DIAGNOSING TEST FAILURES (13.7%)

*continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"><li>✓ Determine which emissions are out of range (if any) and decide which system or systems may be at fault.</li><li>✓ Following manufacturer's procedures, check for trouble codes that implicate particular systems.</li><li>✓ Check input sensors to determine whether they function properly.</li><li>✓ Check computer outputs to determine whether any are abnormal.</li><li>✓ Check for mechanical failures that affect emissions, e.g., a faulty valve train, leaking head gaskets, worn rings or pistons.</li><li>✓ Check for EVAP system failures.</li><li>✓ Using a laboratory oscilloscope, verify O<sub>2</sub> sensor operation and check its output for fuel control.</li><li>✓ Make checks as needed if excessive NO<sub>x</sub> emissions were the cause of failure.</li><li>✓ Make checks as needed if excessive HC emissions were the cause of failure.</li><li>✓ Make checks as needed if excessive CO emissions were the cause of failure.</li><li>✓ Make checks as needed if CO<sub>2</sub> or O<sub>2</sub> emissions were out of range.</li><li>✓ Check the maintenance of systems that need periodic maintenance, e.g., ignition systems, systems that require filters.</li><li>✓ Using a DVOM's minimum, maximum, and average readings, determine whether a vehicle is running in closed loop.</li><li>✓ Resolve conflicts among diagnostic readings, especially those that suggest one component failure is causing other systems to indicate failures that may not be real.</li><li>✓ Check appropriate references for information that will aid in diagnosis.</li><li>✓ Pretest a vehicle that failed its smog check at another shop to establish a baseline.</li></ul>	<ul style="list-style-type: none"><li>✓ Knowledge of how missing, modified, disconnected, damaged, plugged, deteriorated, or corroded components affect the functioning of the systems of which they are parts, e.g., of how emissions are affected by the components' flaws.</li><li>✓ Knowledge of whether particular kinds of tampering do or do not affect the MIL of a computer control system.</li><li>✓ Ability to detect covert tampering with emissions-control or emissions-related components.</li><li>✓ Ability to use the pattern of a failed vehicle's emissions readings as a guide to the vehicular system or systems that are probably at fault.</li><li>✓ Ability to use a scan tool to check input sensor functioning and to obtain diagnostic trouble codes.</li><li>✓ Knowledge of when to use particular diagnostic equipment.</li><li>✓ Knowledge of approved sources of help in interpreting trouble codes and in detecting false codes.</li><li>✓ Ability to use a lab scope to check the basic input/output functioning of a vehicle's sensors and computer.</li><li>✓ Knowledge that checking and interpreting the condition of the engine oil is basic to understanding emissions-related failures, e.g., diluted with gasoline.</li><li>✓ Knowledge that checking and interpreting engine timing is basic to understanding emissions-related failures.</li><li>✓ Knowledge that understanding ignition systems is basic to understanding emissions failures.</li><li>✓ Knowledge of innovations, e.g., of distributorless ignition systems, of electrically driven air injection systems, of how they operate, and of how they fail.</li><li>✓ Knowledge of normal emissions readings for a vehicle in good condition.</li><li>✓ Knowledge of the diagnostic checks needed if a vehicle fails for excessive NO<sub>x</sub> emissions.</li><li>✓ Knowledge of the diagnostic checks needed if a vehicle fails for excessive HC emissions.</li><li>✓ Knowledge of the diagnostic checks needed if a vehicle fails for excessive CO emissions.</li><li>✓ Knowledge of the systems that may be implicated if O<sub>2</sub> and CO<sub>2</sub> emissions readings are out of range and of the diagnostic checks that should be made.</li><li>✓ Ability to judge from a test drive what may be causing a vehicle to fail, i.e., ability to identify sounds, odors, or vibrations that implicate particular systems.</li><li>✓ Knowledge of how to locate and use diagnostic aids, e.g., emissions pattern charts, trouble trees, vacuum diagrams, wiring diagrams, cross-references that relate voltages to temperatures.</li><li>✓ Ability to identify the causes of wiring defects, e.g., excessive heat, vibration, or dampness, gnawing by rodents.</li><li>✓ Knowledge of how to use automotive manuals and CD-based, DVD-based, or on-line references in diagnosing smog check failures.</li><li>✓ Knowledge of how neglecting preventive maintenance causes problems, such as arcing plug wires or clogged filters, that affect emissions.</li><li>✓ Knowledge of frequent causes of failure, e.g., clogged EGR passages, faulty temperature sensors that cause EGR valves to open or close when they shouldn't, defective O<sub>2</sub> sensors, defective AIS diverter valves.</li><li>✓ Ability to test whether sensors are working properly, i.e., ability to use DVOMs and DSOs to assess their functioning.</li><li>✓ Ability to use basic diagnostic equipment, e.g., oscilloscopes, timing lights and scan tools, and specialized equipment, e.g., mirrors for locating multiple O<sub>2</sub> sensors.</li><li>✓ Knowledge that emissions readings may mislead—e.g., a vehicle failed for HC emissions may show 14% CO<sub>2</sub> and less than 1% O<sub>2</sub>, which indicate no misfire, but with the engine under load misfires may be heard or felt.</li></ul>

**VIII. DIAGNOSING TEST FAILURES (13.7%)***continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
	<ul style="list-style-type: none"><li>✓ Knowledge of the causes of engine misfires, e.g., knowledge that any source of unmetered outside air, such as leaking vacuum brake boosters, may cause lean misfires.</li><li>✓ Ability to use an oscilloscope to identify the causes of misfires, e.g., faulty coils, modules, or reluctors.</li><li>✓ Knowledge that in pre-OBD-II cars, MAP and mass airflow sensors may not set trouble codes under out of specification conditions.</li><li>✓ Knowledge of how to adjust electronic carburetors.</li><li>✓ Knowledge of where AIS-controlled air should go and of what proportions are normal for different destinations.</li><li>✓ Ability to use the propane enrichment procedure to locate vacuum leaks, e.g., those that cause lean misfires.</li><li>✓ Ability to use a lab scope for sensor testing or to monitor an O<sub>2</sub> sensor's function.</li><li>✓ Knowledge of catalytic converter theory and test procedures.</li><li>✓ Knowledge that misfires can lead to catalytic-converter failure.</li><li>✓ Knowledge of tests of catalytic-converter function, e.g., the oxygen absorption test, the cranking CO test, the intrusive test, and the infrared pyrometer test, and of how to perform them.</li><li>✓ Ability to use a pyrometer to determine which converter in a multiple-converter system is faulty.</li><li>✓ Knowledge of, or ability to determine, how much resistance is required in a secondary ignition system.</li><li>✓ Ability to perform a "cylinder balance (rpm drop)" test to determine whether a cylinder is functional.</li><li>✓ Ability to perform compression and leak-down tests.</li><li>✓ Knowledge of the possible causes of a "dead" cylinder—one that fails to ignite during engine operation.</li><li>✓ Knowledge of how abnormal fuel pressures affect emissions.</li><li>✓ Knowledge that a restricted fuel return line increases injection pressure and affects emissions.</li><li>✓ Knowledge of sequential or cascading failures, e.g., that a faulty ground may cause multiple sensor failures.</li><li>✓ Ability to perform "voltage drop" tests to locate a wiring defect.</li><li>✓ Knowledge that O<sub>2</sub> emissions readings are critical to lean-mixture diagnoses.</li><li>✓ Knowledge that an excessively rich mixture may be due to a faulty O<sub>2</sub> sensor.</li><li>✓ Ability to use a scan tool, lab scope, DVOM, or voltmeter as needed to determine why fuel control is defective.</li><li>✓ Knowledge of the circuits that come into play when a carbureted vehicle undergoes BAR 97 emissions tests and what the circuits should be doing.</li><li>✓ Ability to perform and interpret engine computer systems tests.</li><li>✓ Ability to use a charging-systems tester in diagnosis.</li><li>✓ Ability to determine actual engine temperatures and to correct unacceptable temperatures.</li><li>✓ Knowledge that components that appear to require replacement should be tested before a replacement is made.</li><li>✓ Knowledge that simply replacing a catalytic converter instead of diagnosing the true cause(s) of excessive emissions will mask the cause(s) and lead to early converter failure.</li></ul>

## IX. PERFORMING AND VERIFYING REPAIRS (14.2%)

This area assesses the candidate's ability to repair and/or replace faulty vehicle components, and to bring vehicle components within correct operating specifications.

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
<ul style="list-style-type: none"> <li>✓ Use references to estimate repair costs.</li> <li>✓ Use references to guide repairs, e.g., use vacuum diagrams, wiring diagrams, component locators, emission parts locators.</li> <li>✓ Research whether a repair, such as a manufacturer's recall, is available for a vehicle.</li> <li>✓ Attempt repairs on a gross-polluter vehicle that will bring it nearer emissions specifications and make it eligible for a waiver.</li> <li>✓ Replace a failed catalytic converter.</li> <li>✓ Replace a faulty computer-input sensor, e.g., an O<sub>2</sub> sensor, a MAP sensor, a mass airflow sensor.</li> <li>✓ Clean and repair or replace electrical wiring that has deteriorated or has been disconnected by vibration, burned, or chewed by rodents.</li> <li>✓ Repair wiring problems that affect the vehicle's computer or OBD-II system, e.g., faulty grounds to sensors.</li> <li>✓ Repair vacuum lines that have deteriorated or split, e.g., under thermal stress.</li> <li>✓ Repair ignition system, e.g., replace spark plugs, reconnect plug wires, correct secondary ignition problems.</li> <li>✓ Correct a timing belt malfunction, i.e., adjust, repair, or replace the belt.</li> <li>✓ Eliminate "voltage drop" problems from electrical systems.</li> <li>✓ Repair a malfunctioning EGR system, e.g., clear clogged passages, replace a faulty EGR valve or faulty EGR control system.</li> <li>✓ Repair an intake manifold leak.</li> <li>✓ Repair the AIS, e.g., replace faulty air-switching valves or faulty check valves.</li> <li>✓ Correct a cooling system problem, e.g., clear or replace a plugged radiator, replace a faulty thermostat, replace the fan belt, repair coolant leaks, replace a water pump.</li> <li>✓ Correct a fuel system problem, e.g., overhaul a carburetor, clean or replace fuel injectors, replace a restricted fuel line, replace a faulty pressure regulator.</li> <li>✓ Reroute vacuum hoses that have been installed incorrectly and repair or replace hoses that have been damaged.</li> <li>✓ Perform a cylinder balance test.</li> <li>✓ Clean the throttle plate and any auxiliary speed control device.</li> <li>✓ Following manufacturers' procedures, remove excessive carbon from the engine.</li> <li>✓ Verify that repaired components operate properly.</li> <li>✓ Retest a vehicle with repaired components to verify the success of the repairs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Knowledge of the use of tools and equipment mandated for use in emissions control repairs, e.g., timing lights, fuel cap testers.</li> <li>✓ Knowledge of how a system that requires repair functions, i.e., of how and why it works when in good repair.</li> <li>✓ Ability to recognize or otherwise identify a defective component in need of cleaning, repair, or replacement, e.g., to recognize that the wrong type of spark plug has been installed.</li> <li>✓ Knowledge of disassembly procedures needed to perform emissions-related repairs.</li> <li>✓ Knowledge that common emissions control repairs involve: O<sub>2</sub> sensors; mass airflow sensors; air injection systems; catalytic converters; EGR systems; spark plugs or ignition system wiring; other electrical-circuit components; timing components; exhaust systems; fuel pressure regulators; fuel caps.</li> <li>✓ Knowledge of how to use references—printed manuals, CD-based, DVD-based, and on-line databases—to obtain repair instructions.</li> <li>✓ Ability to interpret and follow the repair instructions in standard repair references, e.g., to use wiring diagrams, vacuum routing diagrams.</li> <li>✓ Knowledge of how to replace a failed sensor and reset the vehicle's computer to accommodate the new sensor.</li> <li>✓ Knowledge that cleaning EGR passages and ports may be routinely required for some failed vehicles, e.g., high-mileage vehicles, older cars with rotary engines.</li> <li>✓ Ability to repair an EGR system, e.g., to clear its passages and ports, to replace a defective EGR valve.</li> <li>✓ Knowledge of, or ability to find, correct procedures for repairing older vehicles, e.g., the procedure for repairing the mechanical advance in the distributor of a vehicle so equipped.</li> <li>✓ Ability to repair or replace a leaking intake or exhaust manifold.</li> <li>✓ Ability to repair cooling systems, e.g., to replace a faulty thermostat, to clear or replace a plugged radiator, to replace a failed coolant sensor.</li> <li>✓ Ability to repair fuel systems, e.g., to repair or replace a faulty fuel pump, to replace a faulty fuel injector, to overhaul a carburetor, to recognize and replace a faulty fuel cap.</li> <li>✓ Ability to repair an AIS, e.g., to ensure that the diverter valve switches properly and routes air correctly.</li> <li>✓ Ability to replace catalytic converters, e.g., to choose the correct converter for the repair, to orient particular types of converter correctly, to prevent exhaust leaks at the converter.</li> <li>✓ Ability to replace deteriorated vacuum hoses and to route and connect the new hoses correctly.</li> <li>✓ Ability to repair electrical circuitry, e.g., to route wires correctly, to make correct connections with wire of the correct gauge, to follow color codes as needed.</li> </ul>

**IX. PERFORMING AND VERIFYING  
REPAIRS (14.2%)**

*continued*

ADVANCED TASKS	ASSOCIATED KNOWLEDGE
	<ul style="list-style-type: none"> <li>✓ Ability to perform valve train repairs , e.g., to replace valves, valve lifters, or valve springs as needed, to regrind valve seats.</li> <li>✓ Knowledge that technicians should avoid prolonged cylinder balance tests, which overheat catalytic converters.</li> <li>✓ Knowledge of how to clean away corrosion without causing further damage to automotive components.</li> <li>✓ Knowledge of procedures for verifying that the thermostatic air cleaner operates properly.</li> <li>✓ Ability to use diagnostic equipment—scan tool, oscilloscopes, hand vacuum pump, vacuum gauge, compression gauge, fuel-pressure gauge, propane enrichment equipment, an exhaust analyzer, and the like—to verify the success of a repair.</li> <li>✓ Knowledge of the value of multiple tests that produce mutually confirming results concerning the success of repairs,</li> <li>✓ Knowledge that an emissions test will verify the success of a catalytic converter replacement.</li> <li>✓ Knowledge that manual-mode emissions testing allows a technician to observe the effectiveness of repairs.</li> </ul>

## SECTION VI: THE EXAMINATION PROCESS

### Examination Administration through Experior

BAR contracted with Experior Assessments, LLC (Experior) of St. Paul, Minn., to administer its computerized examinations. Smog Check Technician candidates may test at any of Experior's 10 California Testing Centers, which are located in Diamond Bar, Alameda, Sacramento, San Diego, Fresno, Fremont, Rancho Cordova, Van Nuys, Cerritos and Colton. Other testing site locations may be added, based on anticipated statewide candidate volume.

All questions and requests for information about examination administration should be directed to:

Experior  
3110 Gold Canal Drive, Suite B  
Rancho Cordova, CA 95670  
TDD User: 800-790-3926  
Voice: 800-897-2241

### Examination Registration

Once BAR approves your application, it will notify Experior that you may take your examination. Experior will then mail you a Notice of Eligibility with detailed instructions on how to register for and schedule your examination.

#### REGISTRATION BY MAIL

You may mail your examination request and \$65 payment to Experior at the address above, and it will be processed within 48 hours from the time it is received. (Please allow four to eight days for mail delivery.) You may pay by including a MasterCard or Visa number, money order, business check or cashier's check. PERSONAL CHECKS AND/OR CASH ARE NOT ACCEPTED, AND REGISTRATIONS RECEIVED VIA EXPRESS DELIVERY ARE NOT PROCESSED MORE QUICKLY THAN THOSE RECEIVED BY REGULAR DELIVERY METHODS.

If you register for your examination by mail, you must then call to schedule your examination appointment (see "Scheduling the Examination" below for details).

#### TELEPHONE REGISTRATION

You may also register for and schedule your exam with one phone call, using a credit card. Please have your Notice of Eligibility and your MasterCard or Visa available before you call 800-897-2241 between 5 a.m. and 6 p.m. (Pacific time).

### Scheduling the Examination

#### APPOINTMENTS

Once you have paid the \$65 exam registration fee to Experior, you must then schedule an appointment time and place for taking your examination by calling 800-897-2241 between 5 a.m. and 6 p.m. (Pacific time). You may take your examination at any California Experior Testing Center. Please see the maps

on Pages 36 and 37. Appointments are available up to six days per week. Contact Experior soon after you receive your Notice of Eligibility to get your preferred site and time.

**You should arrive at least 10 minutes before your scheduled appointment** to allow time for you to sign in, verify your identification and have your photo taken. As a security measure, this photograph will be printed on your license. **If you refuse to be photographed, you will not be allowed to take the examination.**

**Note:** if you need eyeglasses or corrective lenses to read diagrams or to work at a computer for three hours, be sure to bring them with you to the test site.

#### RESCHEDULING

If you miss or are late for your scheduled appointment, you will forfeit your examination fee. If you need to reschedule your appointment, you must contact Experior three full Experior Scheduling Center (M-F) days before your appointment to allow time to refill your appointment slot. You may reschedule your examination by calling Experior at 800-897-2241.

#### EXAM ELIGIBILITY EXPIRATION

**Your examination eligibility expires if you fail to schedule or do not pass an examination within 90 days after being deemed eligible.**

Your Notice of Eligibility contains important date information. It indicates the date your application was approved. You must take the examination within 90 days of the date specified in the Notice, or you will forfeit your fee and you will be required to reapply to BAR and submit a new application and \$20 application fee.

#### SEVERE WEATHER

In the event of severe weather or disaster, Experior may need to cancel scheduled examinations. In this situation, Experior personnel will attempt to contact you via telephone; however, you may confirm your testing schedule by calling Experior registration at 800-897-2241. If a site is closed, examinations will be rescheduled at your earliest convenience, without a rescheduling fee.

#### DIRECTIONS TO THE EXAM SITE

The maps on Pages 36 and 37 include the phone number for each site. If you need help finding a site, the staff there can assist you by phone.

### Identification Requirements

Upon arriving at the testing center, you must present two forms of identification that bear your signature to be admitted to the examination. One also must have your photo and complete physical description. The name on the identification must be the same as the name used on your application for licensure (including designations such as "Jr." or "III," etc.). **The only acceptable forms of photo identification are:**

- an unexpired California Driver License (including a temporary license with a photo); or
- an unexpired California Department of Motor Vehicles Identification Card (including a temporary ID card with a photo); or
- a current Military Identification (Active Duty); or
- a valid passport less than five years old.

The use of any other photo identification must be approved by Experior at least 10 days **BEFORE** the examination date.

**Applicants without two forms of acceptable identification will not be admitted.**

IF YOU ARE NOT ADMITTED, YOU WILL FORFEIT THE EXAM FEE AND YOU WILL BE REQUIRED TO PAY ANOTHER EXAM FEE IN ORDER TO SCHEDULE AN EXAM.

## Examination Security

### CALIFORNIA LAW

Section 123 of the California Business and Professions Code states: It is a misdemeanor for any person to engage in any conduct which subverts or attempts to subvert any licensing examination or the administration of an examination, including, but not limited to:

- Conduct which violates the security of the examination materials;
- Removing from the examination room any examination materials without authorization;
- The unauthorized reproduction by any means of any portion of the actual licensing examination;
- Aiding by any means the unauthorized reproduction of any portion of the licensing examination;
- Paying or using professional or paid examination-takers for the purpose of reconstructing any portion of the licensing examination;
- Obtaining examination questions or other examination material, except by specific authorization either before, during, or after an examination; or
- Selling, distributing, buying, receiving, or having unauthorized possession of any portion of a future, current, or previously administered licensing examination.
- Communicating with any other examinee during the administration of a licensing examination.
- Copying answers from another examinee or permitting one's answers to be copied by another examinee.
- Having in one's possession during the administration of the licensing examination any books, equipment, notes, written or printed materials, or data of any kind, other than the examination materials distributed, or otherwise authorized to be in one's possession during the examination.
- Impersonating any examinee or having an impersonator take the licensing examination on one's behalf.

Nothing in this section shall preclude prosecution under authority provided for in any other provision of law. In addition to any other penalties, a person found guilty of violating this section, shall be liable for the actual damages sustained by the agency administering the examination not to exceed ten thousand dollars (\$10,000) and the costs of litigation.

### EXPERIOR EXAMINATION SECURITY PROCEDURES

The following security procedures also apply during the examination:

- No cameras, notes, tape recorders, pagers, cellular phones, or watches/timepieces capable of recording information or receiving pages are allowed in the testing room;
- No manuals, books, notebooks, candidate handbooks, unauthorized scratch paper, dictionaries or notes are allowed in the testing room;
- No guests, visitors or family members are allowed in the testing or reception areas;
- No food or drink may be taken into the testing room;
- No calculators are permitted; and
- No weapons or valuables, including briefcases, duffel bags, large purses and other miscellaneous items, should be brought to the Testing Center. **Only keys and wallets may be taken into the testing room.** Neither BAR nor Experior are responsible for items left in the reception area.

**FAILURE TO FOLLOW ANY OF THESE SECURITY PROCEDURES MAY RESULT IN THE DISQUALIFICATION OF YOUR EXAMINATION. EXPERIOR RESERVES THE RIGHT TO VIDEOTAPE ANY EXAMINATION SESSION.**

## Special Testing Considerations

### AMERICANS WITH DISABILITIES ACT (ADA)

Candidates with a physical or mental impairment that substantially limits a major life activity may be eligible for accommodation in the testing process to assure you that the examination accurately reflects knowledge, skills or abilities. BAR and Experior are fully compliant with ADA guidelines and will provide reasonable accommodations. Scheduling services are also available via our Telecommunications Device for the Deaf (TDD) by calling 800-790-3926.

### ACCOMMODATION PROCEDURES

**Candidates requiring special testing arrangements due to a physical or mental impairment must submit a request to BAR for such arrangements at the time of application. Please see Page 7 for details.**

## SECTION VII: THE LICENSING EXAMINATION

### Examination Administration

The Smog Check Technician Licensing Examinations contain 125 multiple-choice scored questions and up to 10 pretest questions. Candidates are allowed three hours to complete the exam. The exam will be administered by computer at an Experior testing center. You do not need any computer experience or typing skill to take your exam. You will have a personalized introduction to the testing system and an introductory lesson on the computer before you start your test.

### Multiple-Choice Questions

Multiple-choice questions are used throughout the examination. These are questions in which four answers are provided, only one of which is correct.

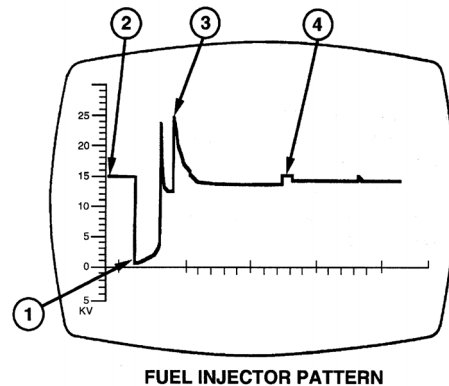
Examination candidates should carefully read the following:

1. For each multiple-choice question, you may select only one answer.
2. There is no penalty for guessing. Scores are based on the number of overall correct answers. **It is to your advantage to answer as many questions as you can.**
3. Some questions will require you to use provided reference materials to find the correct answer.
4. Suggestions for taking multiple-choice examinations:
  - a) Your first answer is often your best answer. Don't spend too much time on any one question.
  - b) If more than one answer seems to be correct, choose the answer that seems correct most often.

### SAMPLE EXAMINATION QUESTIONS

1. While performing a visual inspection, a technician observes there is no EGR amplifier, even though one is shown on the underhood emission label. The EGR valve is connected to ported vacuum. What TAS entry should be made?
  - A. Missing
  - B. Disconnected
  - C. Pass
  - D. Defective
2. Which of the following actions should be taken if a vehicle's timing reads 5 degrees BTDC and the specification for the vehicle is 8 degrees BTDC?
  - A. Adjust timing to specification and perform an after-repairs test.
  - B. Enter "fail" into the TAS for ignition timing because it is out of specification range.
  - C. Enter "pass" into the TAS for ignition timing and 5 degrees BTDC for the timing reading.
  - D. Enter "not applicable" for the ignition timing and specification.

3. What is the primary mission of the Smog Check Referee?
  - A. Perform initial smog inspections.
  - B. Analyze data from TAS analyzers.
  - C. Perform dispute resolutions.
  - D. Perform smog-related repairs.
4. What action should be taken when a 22-month-old car with 25,200 miles on its odometer fails an emissions inspection because of a failed emission component?
  - A. Send the vehicle to a Referee as a pattern failure.
  - B. Have the customer go to a dealer for the repair.
  - C. Retest and issue a certification and exemption.
  - D. Issue a certificate of non-compliance.
5. If a vehicle equipped with a contact point ignition system fails the ignition timing specification, what step should be performed **FIRST**?
  - A. Check coil saturation.
  - B. Check the dwell angle.
  - C. Check condenser output.
  - D. Adjust the timing to manufacturer's specifications.
6. Which of the following statements describes the difference between a three-wire oxygen sensor and a single-wire oxygen sensor?
  - A. A three-wire is more accurate.
  - B. A single-wire is more durable.
  - C. A single-wire sends information slower.
  - D. A three-wire allows earlier closed-loop operation
7. Use the following exhibit to answer this question.



At what point in this scope pattern would the fuel injector be open?

- A. 1
- B. 2
- C. 3
- D. 4

(Correct answers to these questions can be found at the end of Section IX.)

## SECTION VIII: AFTER THE EXAMINATION IS OVER

### Examination Results

At the end of your test, you will receive a printed Score Report. The report indicates your overall score and grade, including the number of questions answered correctly, and whether you passed or failed.

To pass the examination, you must correctly answer a predetermined minimum number of questions for the entire examination. Your total score, the minimum passing score, and the scores for each of the sections of the examination will be identified on each candidate's score report. The scores for each of the sections are provided to give you more details about your performance on the examination. You may refer to the examination plans in Section V of this handbook for the specific knowledge, skills and abilities needed for each section. Only correctly answered questions count toward your examination score.

### CONFIDENTIALITY OF EXAMINATION RESULTS

Examination results are the property of the person who took the examination, and will not be released to anyone else without the written permission of the candidate.

### Retaking an Examination

Once you have received your Examination Eligibility Notice, you will be allowed two attempts to pass the examination. If you do not pass your first examination, call 800-897-2241 to schedule a second examination appointment. BAR requires 14 days between examination attempts.

If you do not pass the examination in two attempts, you must submit a new application, with a \$20.00 application fee, to:

Department of Consumer Affairs  
Bureau of Automotive Repair  
Licensing Unit  
P.O. Box 989001  
West Sacramento, CA 95798-9001

If you wish to send your application and fees by an express carrier, send to:

Department of Consumer Affairs  
Bureau of Automotive Repair  
10240 Systems Parkway  
Sacramento, CA 95827-3006

**You must wait at least 14 days between examination attempts. You will be charged a fee of \$65 each time you take the examination.**

See the flowchart on Page 35 for details.

### Comments on Examination Contents

Any candidate who wishes to comment on examination content is encouraged to do so. Put your comments in writing and send to BAR. Comment sheets are also available from the Proctor at the testing location. You must include the following information:

1. Your name, Smog Check Technician license number and complete mailing address.
2. The date and location of the examination.
3. A detailed description of the problem or concern.

Please mail your comments to:

Bureau of Automotive Repair  
Standards and Training Unit  
10240 Systems Parkway  
Sacramento, CA 95827-3006

## SECTION IX: OBTAINING A LICENSE

After passing the examination, your record is sent back to BAR to review for enforcement actions, as well as family support actions before a license may be issued. If there are no administrative or family support holds on your license, your results will be updated into the BAR Vehicle Information Database (VID) within five business days of your examination. You must perform a Data File Refresh on your analyzer to update it with the new license expiration date.

### **No additional fees are collected before the license is issued.**

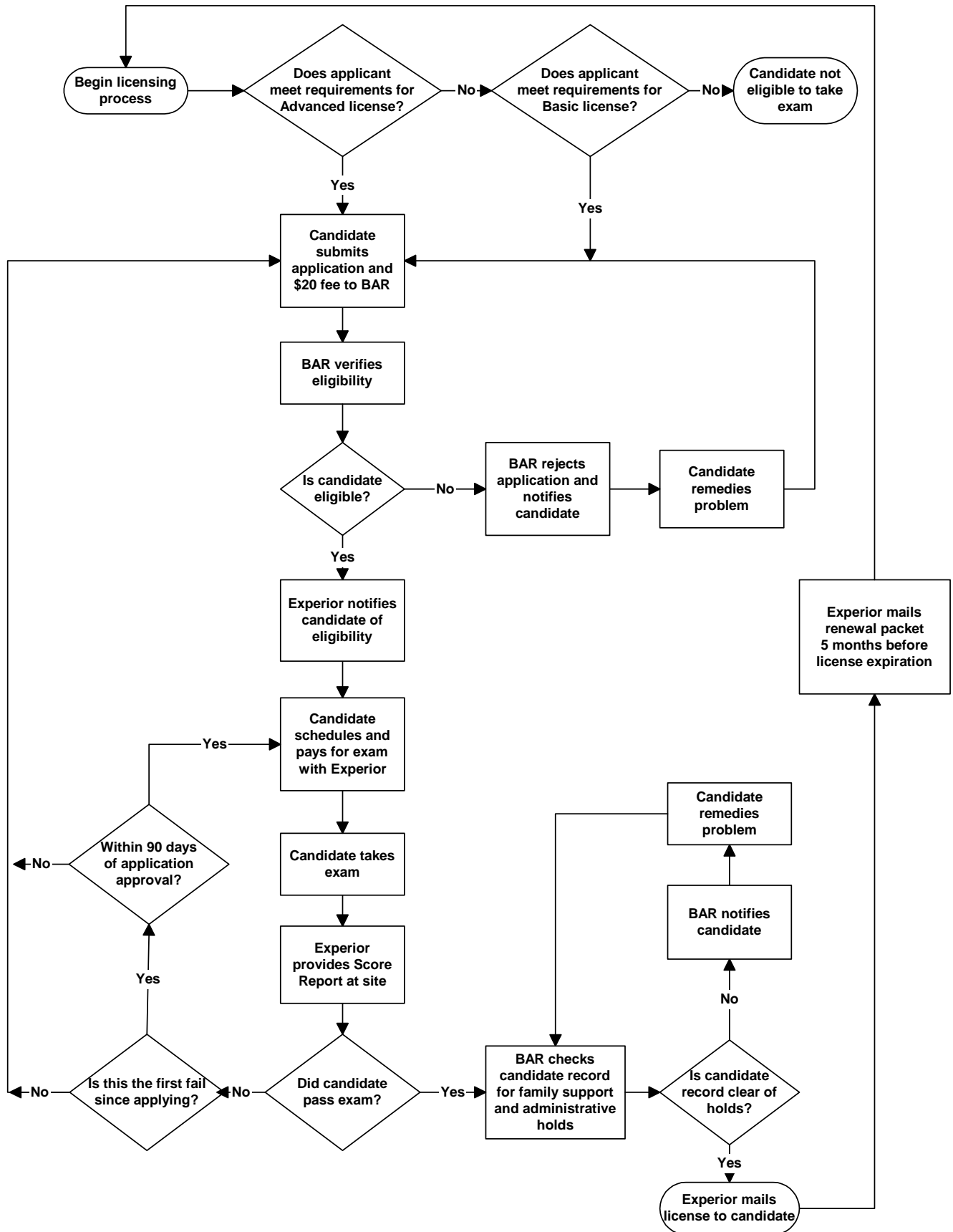
A person may not perform the duties of a licensed technician without a current license. Technicians must pass an examination every other year to remain licensed. The license expiration dates are adjusted so that the licenses expire in the month of the technician's birthday. Therefore, licenses are valid for 18 to 30 months, depending upon the technician's birth month and month in which the technician passes the licensing examination. This process is fully explained in California Code of Regulations, Title 16, Section 3340.29 (e).

Before we can issue a technician's license to you, we must have information required by Sections 44014 and 44031.5 of the Health and Safety Code. The Chief of the bureau is responsible for maintaining the information you provide. The information may be transferred to other government agencies if the agencies need it to perform their legal duties. You have a right to review the records maintained on you by this bureau, unless the records are identified as confidential information and exempted in Section 1798.3 of the Information Practices Act.

**Disclosure of your Social Security number is mandatory.** Section 30 of the Business and Professions Code and Pub. L. 94-455 [42 w. 405(c)(2)(C)] authorizes collection of your Social Security number. Your Social Security number will be used exclusively for tax enforcement purposes and for purposes of compliance with any judgment or order for family support in accordance with section 11350.6 of the Welfare and Institutions Code. If you fail to provide your Social Security number, you will be reported to the Franchise Tax Board which may assess a \$100 penalty against you.

Answers to sample examination questions.  
1. A; 2. C; 3. C; 4. B; 5. B; 6. D; 7.A.

# LICENSING FLOWCHART



## CALIFORNIA TESTING CENTERS

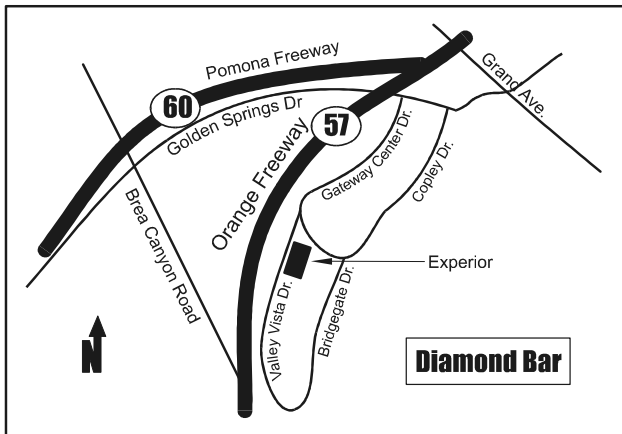
If you are unfamiliar with the area, please contact the testing center during testing hours for directions. Please direct registration, scheduling and any other questions to Experior Central Registration at 800-897-2241.

**MAPS ARE NOT DRAWN TO SCALE.**

### Diamond Bar Center

1370 Valley Vista Drive, Suite 104  
Diamond Bar, CA 91765  
Phone: 909-396-1185

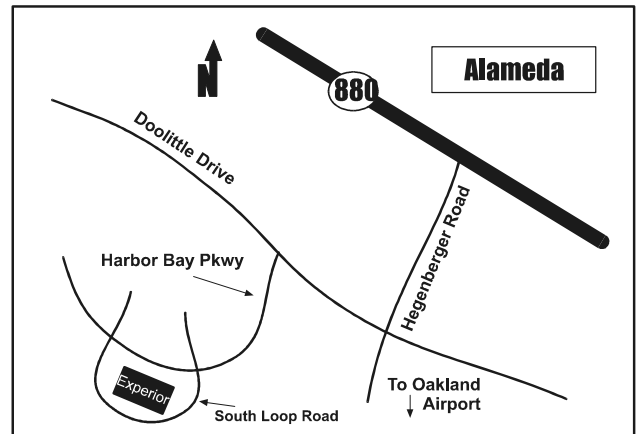
**From Hwy 60 (Pomona Freeway) east**, take the Brea Canyon Road exit. Head east at freeway exit; cross over Brea Canyon Road. Continue east on Golden Springs Dr. to Gateway Center Dr.; turn right. Turn right again on Valley Vista Dr. **From Hwy 57 (Orange Freeway) or 60 west**, take the Grand Ave. exit south. Go west on Golden Springs Dr. Turn left at Gateway Center Dr., and right on Valley Vista Dr. The Experior testing center is on your left, **in the University of Phoenix building**. Parking is available around the building.



### Alameda Center

1420 Harbor Bay Parkway, Suite 130  
Alameda, CA 94502  
Phone: 510-864-2664

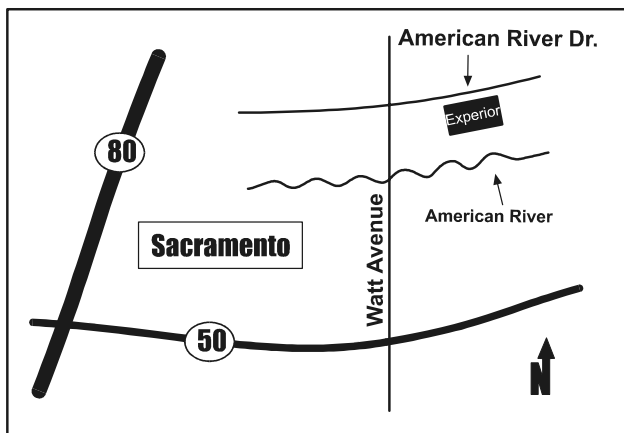
**From Interstate 880**, exit on Hegenberger Road south toward the Oakland airport. Turn right on Doolittle Drive. At the second stop light, turn left onto Harbor Bay Parkway (note sign indicating Harbor Bay Business Park). Drive approximately one mile and turn left on South Loop Road, following it around until you see **Building 1420**. Parking is available around the building.



### Sacramento Center

3600 American River Drive, Suite 260  
Sacramento, CA 95864  
Phone: 916-971-3672

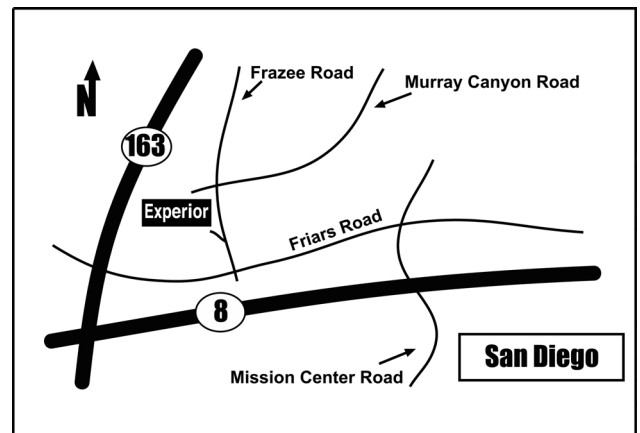
From Highway 50, take the Watt Avenue exit north. Proceed ½ mile to American River Drive; turn right. The Experior testing center will be in the **second building on the right-hand side**. Parking is available at the front of the building.



### San Diego Center

1450 Frazee Road, Suite 410  
San Diego, CA 92108  
Phone: 619-574-1840

From Highway 163, take the Friars Road exit east to Frazee Road. Turn left (north) on Frazee Road. The Experior testing center is in the building on your left. Parking is available all around the building.



## CALIFORNIA TESTING CENTERS (CONT.)

**Note: Maps are not drawn to scale.**

### **Fresno Center**

125 E. Barstow Avenue, Suite 136  
Fresno, CA 93710  
Phone: 559-226-3334

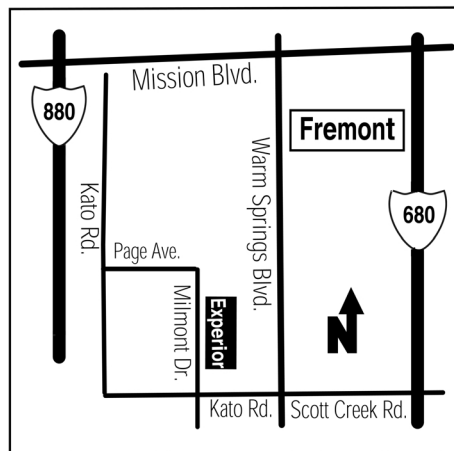
From Hwy 41, exit west on Shaw; turn right (north) on Blackstone. From northbound I-99, exit east on Shaw; turn left (north) on Blackstone. Turn right (east) on Barstow. At 125 E. Barstow, turn right on Diana, and then right into the parking area. The Experior testing center is located in the second building from Barstow. Parking is available around the building.



### **Fremont Center**

48860 Milmont Drive, Suite 103C  
Fremont, CA 94538  
Phone: 510-687-0821

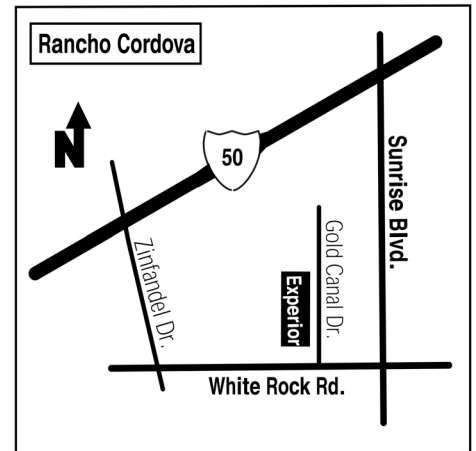
From I-880, take the Mission Blvd exit and head east; turn right (south) on Warm Springs Blvd, right again on Kato Rd and right again on Milmont Dr. From I-680, take the Scott Creek Rd exit and head west; Scott Creek Rd becomes Kato Rd; turn right on Milmont Dr. The Experior testing center is on your right. Parking is available around the building.



### **Rancho Cordova Center**

3110 Gold Canal Drive, Suite B  
Rancho Cordova, CA 95670  
Phone: 916-851-8340

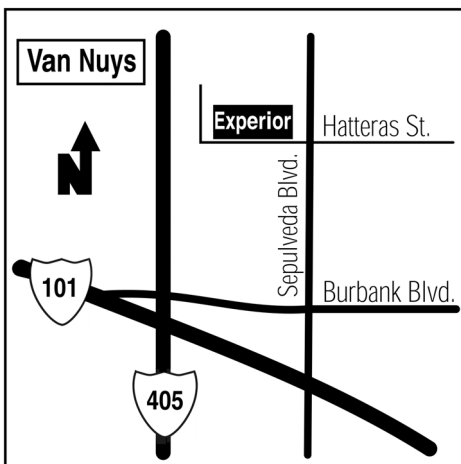
From Hwy 50, take either the Sunrise Blvd. or Zinfandel Dr. exit and head south. Turn on White Rock Rd. and turn again onto Gold Canal Dr. The Experior testing center is on your left. Turn into the first driveway on your left to park in front of the building. Additional parking is available around the building.



### **Van Nuys Center**

Hewlett Packard Building  
5805 Sepulveda Blvd., Suite 601  
Van Nuys, CA 91411  
Phone: 818-781-9981

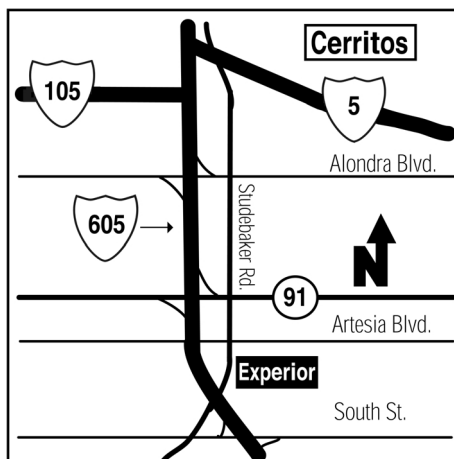
From I-405, take the Burbank Blvd exit and head east; turn left (north) on Sepulveda Blvd. The Experior testing center is located at the intersection of Sepulveda and Hatteras. Paid parking is available in the lot; free parking may be available on the street.



### **Cerritos Center**

18000 Studebaker Road, Suite 680  
Cerritos, CA 90703  
Phone: 562-860-1748

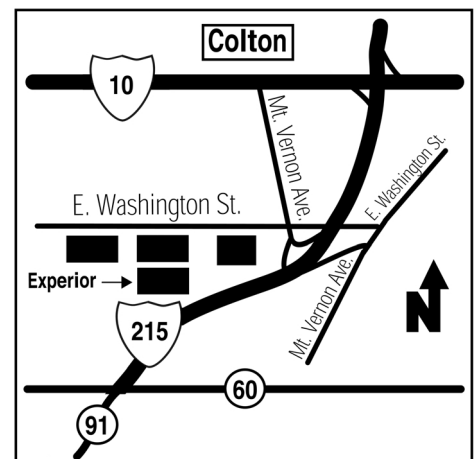
From I-605 South, take the Alondra Blvd exit, turn left (east) on Alondra Blvd and right (south) on Studebaker. From I-605 North, take the South Street exit; turn left (west) on South St. and right on Studebaker. Parking is available around the building.



### **Colton Center**

Rancho Las Palomas  
1060 E. Washington Street, Suite 110  
Colton, CA 92324  
Phone: 909-783-2255

From I-215, take the Mt. Vernon Ave. exit; head west on E. Washington. The Experior testing center will be on your left, in the 2-story Rancho Las Palomas building behind Del Taco. Parking is available around the building.



**Exterior**

**3110 Gold Canal Drive, Suite B  
Rancho Cordova, CA 95670  
800-897-2241**

**FIRST  
CLASS  
MAIL**